5-3895-332-12

TM 5-3895-332-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL
MAINTENANCE MANUAL

HAMMER, PILE DRIVER, SELF-POWERED, DIESEL (KOEHRING MODEL DA35) FSN 3895-443-4696

This copy is a reprint which includes current pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY
JANUARY 1970

D 101.11:

READEX FICHE best copy available

SAFETY PRECAUTIONS

WARNING

Never attempt to clean, adjust, fill fuel tank or oil tank while a hammer is in operation.

Insert transport plug before removing hammer from leads.

Stand clear of hammer when it is being lifted to prevent injury if lifting device should fail.

Always report or correct any condition that may result in injury to personnel if operation is to be continued.

Remove transport plug before attempting to start the hammer.

Do not engage the trip mechanism at any time while the hammer is in operation.

Keep a full charged carbon dioxide (CO_2) fire extinguisher in good working order, mounted inside the crane cab, and ready for quick use.

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *17 September 1973*

Operator's and Organizational Maintenance Manual
HAMMER, PILE DRIVER, SELF-POWERED DIESEL
(KOEHRING MODEL DA35)
FSN 3895-443-4696

TM 5-3895-332-12, 29 January 1970, is changed as follows:

Page 2-1. Paragraph 2-1*f.* is added as follows:

f. Maintenance and Operating Supplies required for the initial 8 hours of operating the pile driver are contained in table 2-1.

Tabel 2-1 is added as follows:

Table 2-1. Maintenance and Operating Supplies

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required F/initial operation	(5) Quantity required F/8 hrs operation	(6) Notes
0108 TANK LUBRICATING OIL	9150-754-2832 (1)	OIL, LUBRICATING HDO 30	(2) 11gal	11gal	(1) See C9100-IL for additional data and requisitioning Procedures
	9150-265-7603	OES			
0306 TANK FUEL	9140-286-5294 (1)	FUEL OIL DIESEL Required	24gal (3)	21.6gal (4)	2) See current LO for Grade application and Replenishment intervals.
	9140-286-5296 (1)	Grade DF-2 Wintergrade DF-1	24gal (3)	21.6gal (4)	(3) Tank capacity
					(4) Average fuel consumption is 2.7 gph of continuous operation.

Page B-3, group 0106. For Filter Oil, add maintenance function "0" in column 3, under I (Repair).

Group 0309, add maintenance function "0" in column 3(I) for Fuel Filter.

Page C-1. Appendix C is superseded as follows:

APPENDIX C
BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

C-1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the hammer, pile driver and are required by the crew/operator for operation, installation, or operator's maintenance.

C-2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. Basic Issue Items List — Section II. A list, in alphabetical sequence, of items which are furnished with, and must be turned in with, the end item.

b. Items Troop Installed or Authorized List — Section III. A list in alphabetical sequence of items which at the discretion of the unit commander may accompany the end item, but are NOT subject to be turned in with the end item.

C-3. Explanation of columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability Code(s) (SMR): Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Furnished with Equipment (Basic Issue Items Only). Indicates the quantity of item furnished with the equipment.

f. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

Section II. BASIC ISSUE ITEMS LIST

(1) SMR code	(2) Federal stock number	(3) Description: Ref No. & mfr code	(3) Description: Usable on code	(4) Unit of meas	(5) Qty furn with equip	(6) Illustration: (A) Fig No.	(6) Illustration: (B) Item No.
		RAM LIFTING ROD D35101 (20263)		EA	1	-	

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description: Ref No. & mfr	(3) Description: Usable on code	(4) Unit of meas	(5) Qty auth
	7520-559-9618	CASE: maintenance and Operational Manuals cotton duct, water repellent mildew resistant MIL-B-11743B		EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25B (qty rqr block No. 418), Organizational maintenance requirements for Earth Moving Equipment: Piledrivers.

TECHNICAL MANUAL
No. 5-3895-332-12

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *29 January 1970*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

HAMMER, PILE DRIVER, SELF-POWERED, DIESEL (KOEHRING MODEL DA35) FSN 3895-443-4696

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1–1. Scope

a. These instructions are published for the use of the personnel to whom the diesel pile hammers "MKT Model DA35" are issued. Chapters 1 through 5 provide information on the operation, preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments and storage.

b. Numbers in parentheses on illustrations indicate quantity. Numbers preceding nomenclature callouts on illustrations indicate the preferred maintenance sequence.

1–2. Forms and Records

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For record and report forms applicable to the operator, crew, and organizational maintenance, refer to TM 38–750.

c. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN. AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Section II. DESCRIPTION AND DATA

1–3. Description

a. General. The MKT Diesel Pile Hammer, model DA35, refer to figure 1–1 and 1–2, is a self-contained free piston, compression-ignition machine, operating on the two-cycle principle. The hammer consists of a cylinder, ram-piston, thrust bearing, anvil, guide brackets, vibration damper, trip mechanism, lubrication system, fuel system, drive caps and trip safety mechanism.

b. Cylinder. The cylinder is a stress-relieved weldment, made from steel tubing and plate, with the bore specially chrome plated to prevent seizing, galling, and rapid wear. The shape of the shell forms a fuel and oil tank as well as protection for the fuel system, lubrication system and trip mechanism. Cover plates front and rear provide access for inspection and service of components.

c. Ram-Piston. The ram is a free piston and is the means by which the work output of the hammer is delivered to the pile.

d. Thrust Bearing. Radial thrust or side thrust to the hammer is transmitted to the leads thru the thrust bearing.

e. Anvil. The anvil is located on the bottom of the cylinder and relays the energy from the ram-piston to the pile.

f. Guide Brackets. The guide brackets are used to aline and position the hammer within the leads.

g. Vibration Damper. The vibration damper is located under a shroud and isolates the cylinder from the shock vibration produced by the anvil.

h. Trip Mechanism. The trip mechanism is an off-center linkage mechanism designed to engage with a machined shoulder on the ram-piston for lifting the ram-piston and starting the hammer.

i. Lubrication System. The cylinder, ram-piston and anvil are lubricated by a four plunger cam actuated oil pump. Lubrication oil is supplied to the pump by gravity flow from the oil tank, passing through a wire mesh filter inside the tank.

j. Fuel System. Fuel oil is supplied to a cam actuated fuel pump by gravity flow from the fuel tank, passing through a wire mesh filter inside the tank. Fuel oil is injected through the pump nozzle into the anvil cup.

k. Drive Caps. There are three drive caps and one filler, one concrete cap, one sheet pile cap, one universal cap and one H-Beam filler. All drive caps are provided with an anvil pocket deep enough to receive a 2 to 2½ inch thick cushion block. A drive cap is used to guide and protect the pile.

l. Trip Safety Mechanism. The trip safety mechanism is a device to protect the trip mechanism and must be engaged to start the hammer.

1–4. Difference in Models

This manual covers only the MKT Model DA35 serial numbers 691201 thru 691209. No known unit differences exist for the model covered by this manual.

1–5. Identification and Tabulated Data

a. Identification. The hammer has four major identification plates. The information contained on these plates is as follows:

(1) *Name Plate.* The name plate specifies nomenclature, serial number, manufacturer's name, model number, contract number, date manufactured, length, width, height, shipping weight and publications. It is located on the front of the hammer.

(2) *The Manufacturer's Name Plate.* The name plate specifies the manufacturer's name, address and model number. It is located on the front of the unit.

(3) *The Manufacturer's Instruction Plate.* The instruction plate specifies manufacturer's name, address, model number, serial number, factory ratings, cautions to be observed for transporting, and patents covering the hammer. It is located on the front of the hammer.

(4) *The Manufacturer's Instruction Plate.* The plate specifies types of fuel and lubricating oil, and operating instructions for starting and stopping a hammer. It is located on the front of the hammer.

b. Tabulated Data.

(1) *Hammer, pile driver, self-powered diesel.*

Manufacturer	MKT Division of Koehring Company
Model	DA35
Serial Numbers	691201 thru 691209
Bore	12,000 in. dia.
Stroke (compression)	13.968 in.
Fuel	
Operation (0° to 125°F)	No. 1 diesel fuel VV–F–800–DF–1
High Altitude Operation (above 4,000 feet)	No. 2 diesel fuel VV–F–800–DF–2
Piston displacement	1580 cu. in.
Compression ratio	14.25 to 1
Lubricating Oil, Diesel Engine (√ lubrication chart, fig. 3–1)	
Rated striking energy	21,000 ft.lb./blow
At 57 p.s.i air gauge pressure at 83 blows per min.	

(2) *Accessory items.*

(a) *Oil filter strainer.*

Manufacturer	MKT Corporation
Model	AP–209

(b) *Oil pump.*

Manufacturer	MKT Corporation
Model	32000183

(c) *Fuel filter strainer.*

Manufacturer	MKT Corporation
Model	AP–209

(d) *Fuel pump.*

Manufacturer	MKT Corporation
Model	12–126–3

(e) *Trip mechanism.*

Manufacturer	MKT Corporation
Model	42000462

(3) *Capacities.*

Fuel tank	24 gals.
Lubricating oil tank	11 gals.

(4) *Dimensions and Weights.* (fig 1–1)

Depth	25.750 inches
Width	26.875 inches
Height	190.000 inches
Weight	10,000 pounds

(5) *Nut and bolt torque data.*

Trip mechanism access cover bolts	100 ft.lb.
Lubricating oil pump mounting nuts	60 ft.lb.
Fuel pump mounting nuts	60 ft.lb.
Fuel pump check valve nut	150 ft.lb.
Fuel pump top nut	40 ft.lb.
Fuel pump lock plate cap screws	40 ft.lb.
Fuel and oil line hex nuts	30 ft.lb.
Guide bracket bolts	100 ft.lb.

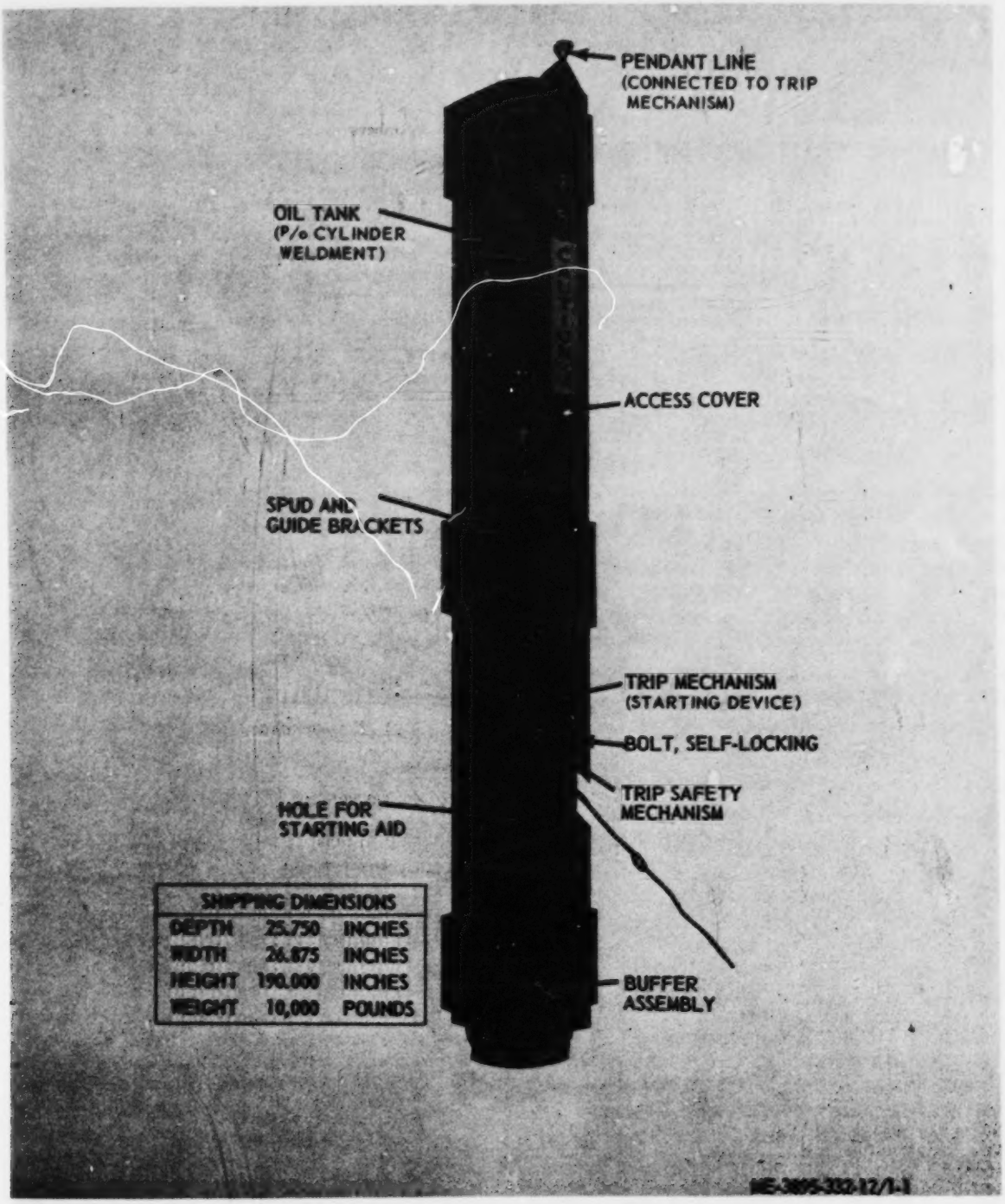

Figure 1–1. Diesel pile hammer, right rear, three-quarter view with shipping dimensions.

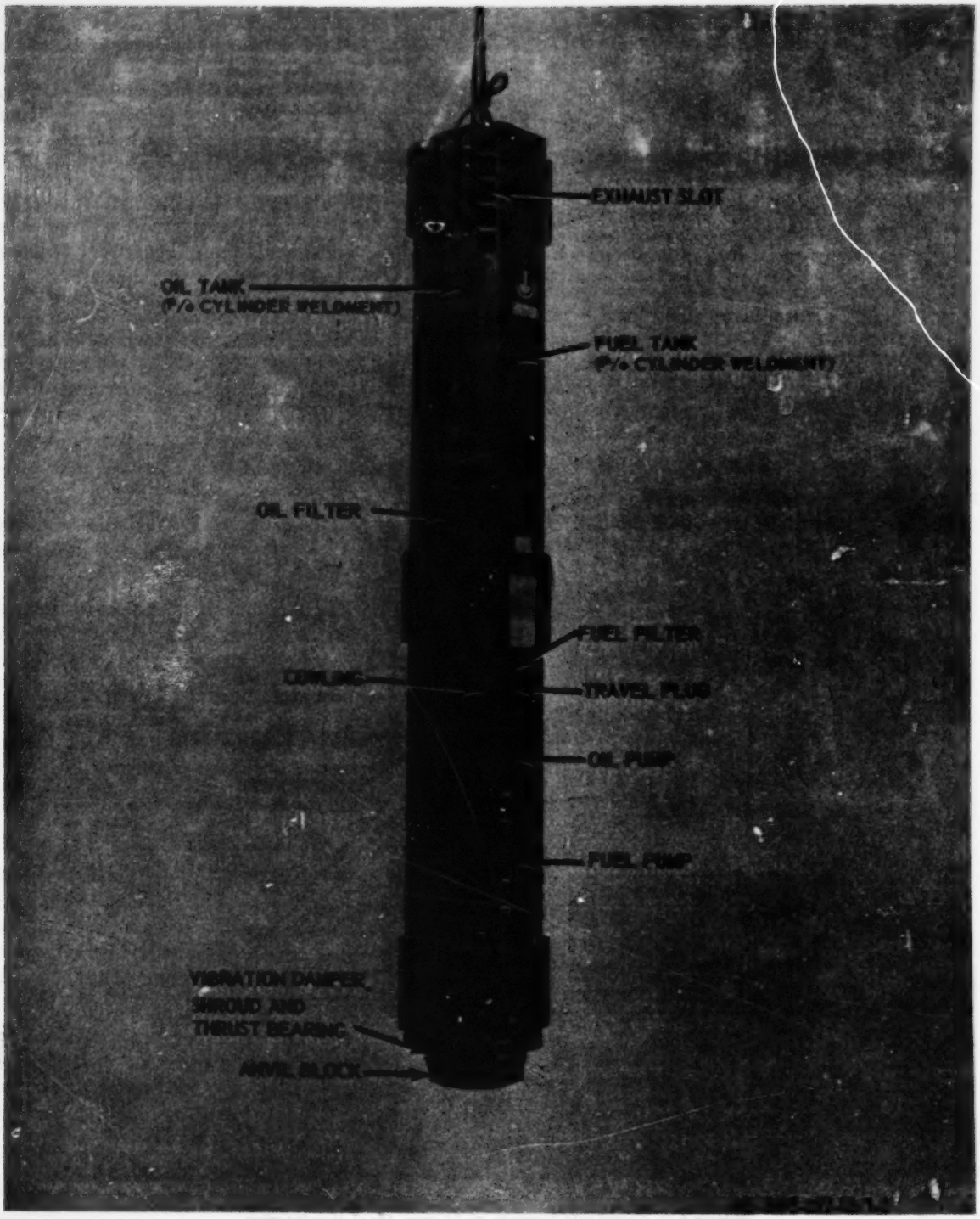

Figure 1–2. Diesel pile hammer, left-front, three-quarter view.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

2–1. Inspecting and Servicing Equipment

a. Make a complete visual inspection of the hammer for any loss or damage that may have occurred during shipment.

b. Refer to paragraph 3–5 for daily preventive maintenance services.

c. Inspect the hammer for fuel and oil leaks.

d. Check all bolts and studs for tightness.

e. Correct or report all deficiencies.

2–2. Installation

a. Lay the hammer horizontally, fuel pump down. (fig. 1–2)

b. Remove the back guide brackets. (fig. 2–1)

c. Fasten a short lifting sling to lifting holes in the top flange of hammer and attach to crane line.

d. Lift hammer into the leads or onto H-Beam Spud.

e. Replace back guide brackets.

f. Disconnect crane line from sling and fasten to pendant line.

g. Remove travel plug.

h. Fasten manila rope to fuel pump cable.

i. The trip mechanism should be in the disengaged position if the trip safety mechanism is operating properly. If it is not, disengage the trip mechanism from engaged position by pulling manila rope attached to fuel pump cable, hold taut. and lift the hammer pendant line until it disengages and drops the ram-piston (fig. 1–1 and 2–1)

Caution: Make sure the fuel pump is disengaged when lifting the hammer line to disengage trip mechanism. Failure to observe this precaution could result in starting the hammer.

j. Lift the hammer two feet, position over drive cap, install cushion block and assemble. (fig. 2–2)

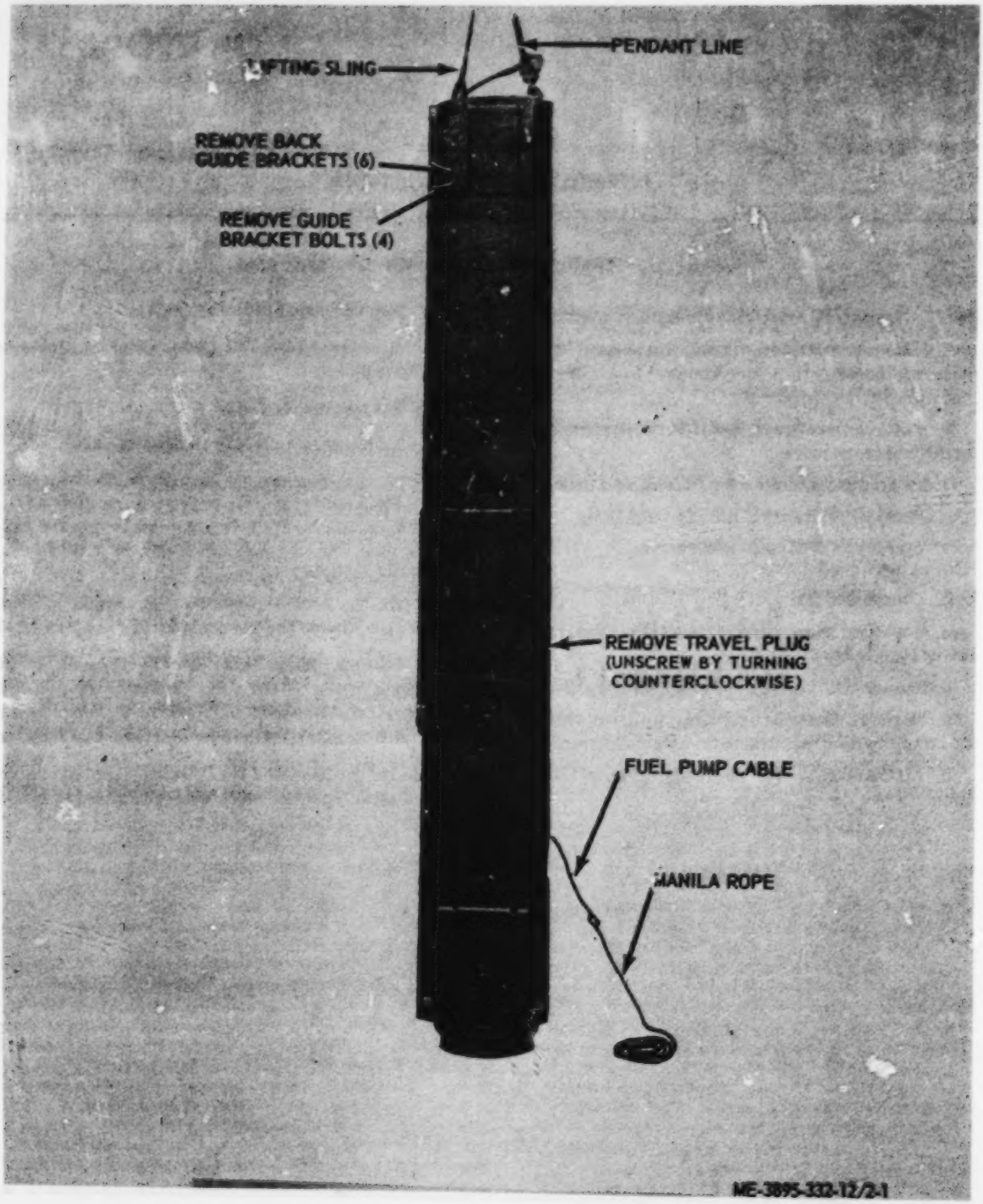

Figure 2–1. Hammer setup, removal and installation.

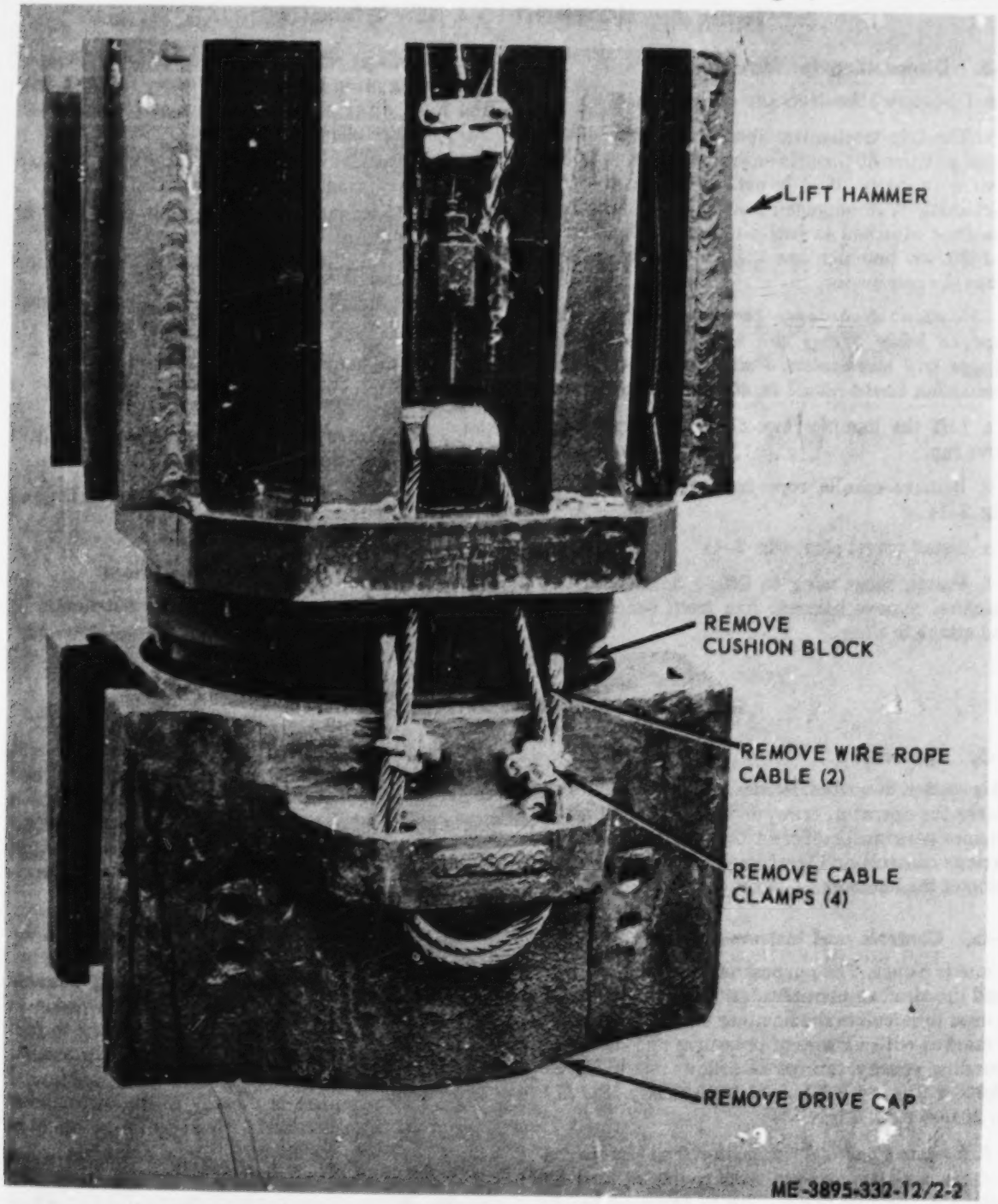

Figure 2–2. Drive cap and cushion block, removal and installation.

Section II. MOVEMENT TO A NEW WORKSITE

2–3. Dismantling for Movement

a. Disconnect the drive cap cables. (fig. 2–2)

b. The trip mechanism should be in the disengaged position if the trip safety mechanism is operating properly. If it is not, disengage the trip mechanism from engaged position by pulling manila rope attached to fuel pump cable, hold taut, and lift the hammer line until it disengages and drops the ram-piston.

Caution: Make sure the fuel pump is disengaged when lifting the hammer line to disengage trip mechanism. Failure to observe this precaution could result in starting the hammer.

c. Lift the hammer two feet and remove the drive cap.

d. Remove manila rope from fuel pump cable (fig. 2–1)

e. Install travel plug. (fig. 2–1)

f. Fasten short sling to lifting holes with two shackles, remove hammer line from pendant line and attach to sling.

g. A hammer could be transported with fuel and lubricating oil in the tanks. In order to drain fuel and lubricating oil before transporting the hammer, use the following steps:

(1) Remove the ⅜ inch pipe plug, located under the caution plate, and drain fuel oil.

(2) Disconnect lubricating oil feed line at pump and drain.

h. Remove back guide brackets. (fig. 2–1)

i. Lower hammer from leads to horizontal position.

j. Remove hammer line and short sling.

k. Install back guide brackets. (fig. 2–1)

l. Lift hammer and accessories on a suitable carrier, block and tie it down.

m. Move the hammer to a new worksite. Unload it and set up for operation.

2–4. Reinstallation after Movement

Unload the hammer and follow the instruction in paragraph 2–2.

Section III. CONTROLS AND INSTRUMENTS

2–5. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments for proper operation of the hammer.

2–6. Controls and Instruments

a. Air Gauge. The purpose of the air gauge is to read the air chamber pressure. This gauge reading is used to calculate the hammer energy. The gauge is marked with a series of pressures and the corresponding energy ratings as follows: 41 P.S.I. = 18,000 ft.lb.; 48 P.S.I. = 19,000 ft.lb.; 53 P.S.I. = 20,000 ft.lb. (fig. 2–3)

b. Remote Control Transmitter. The remote control transmitter controls the amount of fuel bypassed in the fuel pump. This is accomplished by developing a hydraulic pressure in the control hose and moving the remote control plunger in the fuel pump. By partially closing the bypass hole in the fuel pump, more fuel is injected into the hammer's combustion chamber. If the transmitter handle is relaxed, the pressure returns to 40 P.S.I., the bypass holes are open and all the fuel is returned to the tank. Therefore, the hammer will stop. If the handle is set between 90 and 100 P.S.I., the plunger moves its full stroke which completely closes the bypass holes, causing the full amount of fuel to be injected into the combustion chamber and causes the hammer to give its maximum energy. (fig. 2–3)

c. Trip Safety Mechanism. This assembly is designed to prevent the trip mechanism from being accidently engaged, thereby eliminating possible damage to the hammer components. In order to engage the trip mechanism it is necessary to pull on manila rope, hold taut, and allow trip mechanism to be brought down to its lowest position. If the trip mechanism is already in its lowest position, raise approximately 2 feet, pull rope and hold taut while trip mechanism is again brought to its lowest position. Failure to hold rope taut will allow trip stop to move to the safety position and fail to engage trip mechanism. (fig. 2–3)

d. Pile Bearing Formula. The effective energy output of the hammer is determined by the air gauge as previously described. To determine the pile bearing in accordance with the Engineering News formula, which is most widely used in the

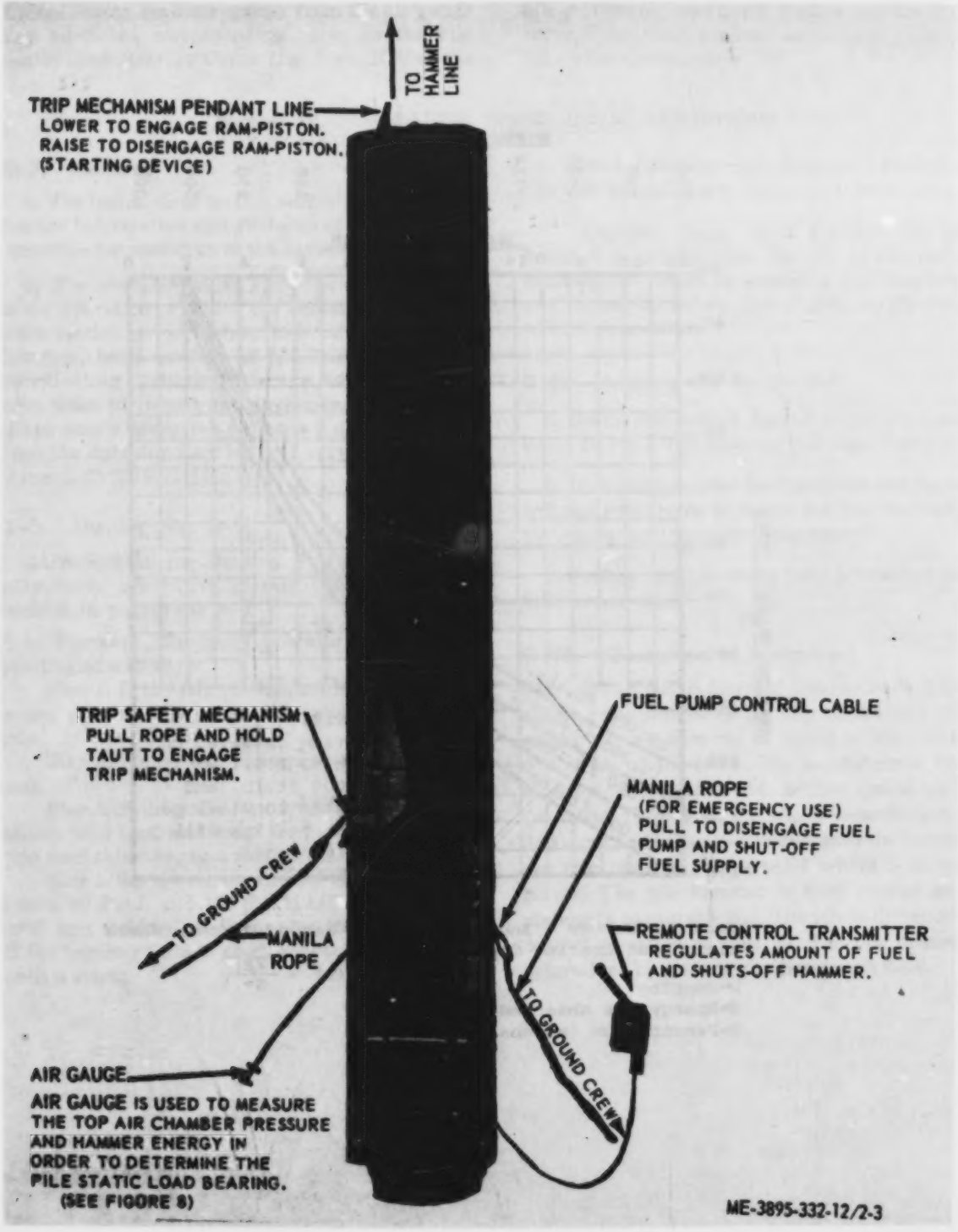
TO HAMMER LINE
TRIP MECHANISM PENDANT LINE
LOWER TO ENGAGE RAM-PISTON.
RAISE TO DISENGAGE RAM-PISTON.
(STARTING DEVICE)
TRIP SAFETY MECHANISM
PULL ROPE AND HOLD TAUT TO ENGAGE TRIP MECHANISM.
TO GROUND CREW
MANILA ROPE
AIR GAUGE
AIR GAUGE IS USED TO MEASURE THE TOP AIR CHAMBER PRESSURE AND HAMMER ENERGY IN ORDER TO DETERMINE THE PILE STATIC LOAD BEARING.
(SEE FIGURE 8)
FUEL PUMP CONTROL CABLE
MANILA ROPE
(FOR EMERGENCY USE)
PULL TO DISENGAGE FUEL PUMP AND SHUT-OFF FUEL SUPPLY.
REMOTE CONTROL TRANSMITTER
REGULATES AMOUNT OF FUEL AND SHUTS-OFF HAMMER.
TO GROUND CREW
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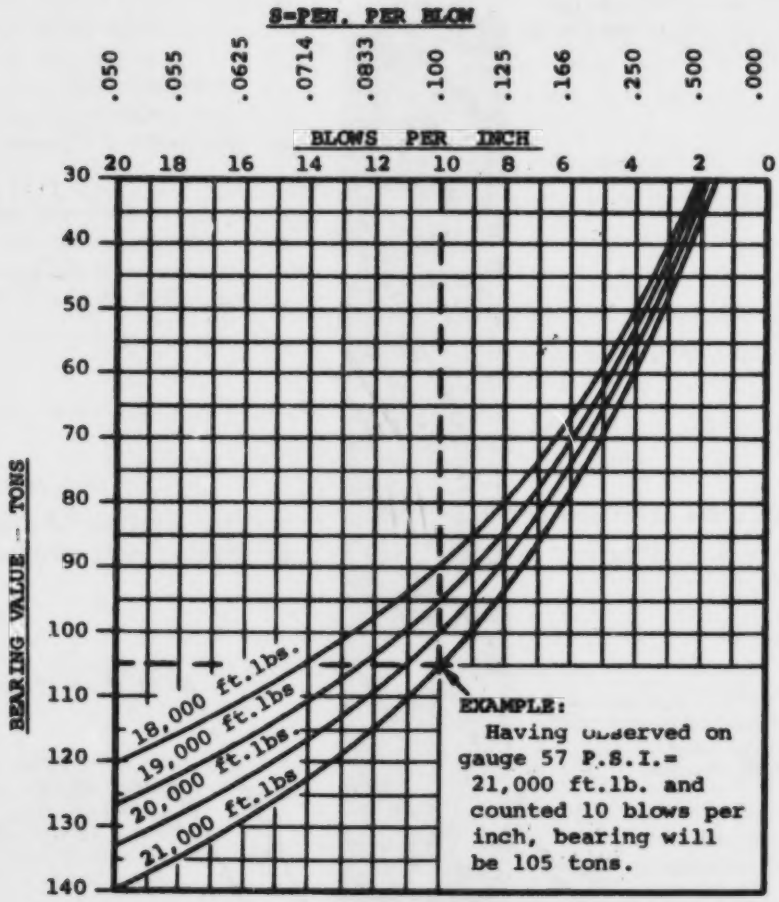
Figure 2–3. Controls and instruments.



Basis For Curves - Engineering News-Record Formula Where Static Load-Bearing Capacity:

$$(L) = \frac{2E}{S+.1}$$

L=Bearing
E=Energy (as observed from gauge)
S=Penetration (as observed)

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Figure 2-4. Pile static load bearing curve.

United States, read the energy from the air gauge and select the corresponding curve on the Pile Static Load Bearing Curve (fig. 2–4). Noting the pile movement, read down the chart to the proper curve. From the curve read across to the pile bearing on the vertical scale.

Section IV. OPERATION UNDER USUAL CONDITIONS

2–7. General

a. The instructions in this section are published for the information and guidance of personnel responsible for operation of the hammer.

b. The operator must know how to perform every operation of which the hammer is capable. This section gives instructions on starting the hammer, basic motions of the hammer, and on coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

2–8. Starting (fig. 2–5)

a. Preparation for Starting. Perform the necessary daily preventive maintenance service described in paragraph 3–5.

b. Starting. The crane operator controls the starting of a hammer.

Step 1. If the trip mechanism is in the disengaged position, the hammer is ready to set on a pile.

Step 2. Center and aline pile under the hammer.

Step 3. Pull manila rope for trip safety mechanism, hold taut, and lower the hammer line until trip mechanism engages ram-piston.

Step 4. Set the remote control transmitter between 90 P.S.I. and 100 P.S.I. Lift hammer line until trip mechanism disengages the ram-piston. If the hammer fails to start, repeat Steps 3 and 4 until it starts.

Step 5. Crane operator must hold the hammer line taut by applying a drag on the crane drum.

Caution: Never lower hammer line while hammer is in operation. Failure to observe this caution can result in engaging trip mechanism and damaging safety link if trip safety mechanism is inoperative.

2–9. Stopping the Equipment

a. Relax transmitter handle so pressure gauge reads 40 P.S.I. The hammer will stop. (para 2–6*b*)

b. If the transmitter malfunctions and hammer will not stop, refer to figure 2–6 for instructions for emergency stopping of hammer.

c. Perform the necessary daily preventive maintenance services.

2–10. Operation of Equipment

The pile hammer is inserted into the leads. Lifting the starting line, with the trip mechanism disengaged, the pile hammer is pulled by the crane up to the top of the leads. The second crane line is attached to the pile which is then pulled up into the leads. The top of the pile is inserted into the drive cap and both are lowered until the bottom of the pile rests on the ground where it is to be driven. The pile hammer is then started as explained in paragraph 2–8. The pile is driven to the desired elevation or bearing. The pile bearing is determined by referring to paragraph 2–6*d*.

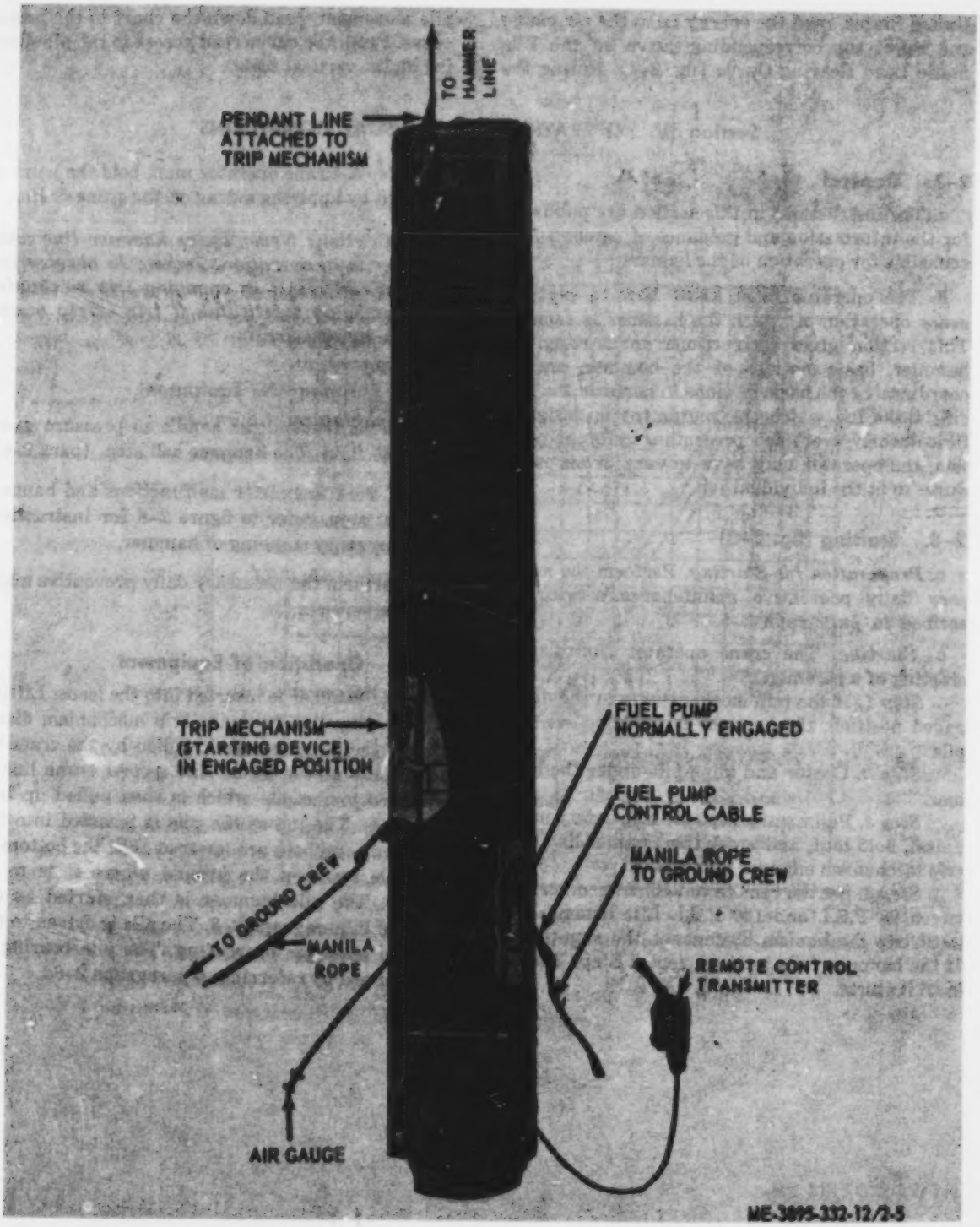


Figure 2–5. Starting the hammer.

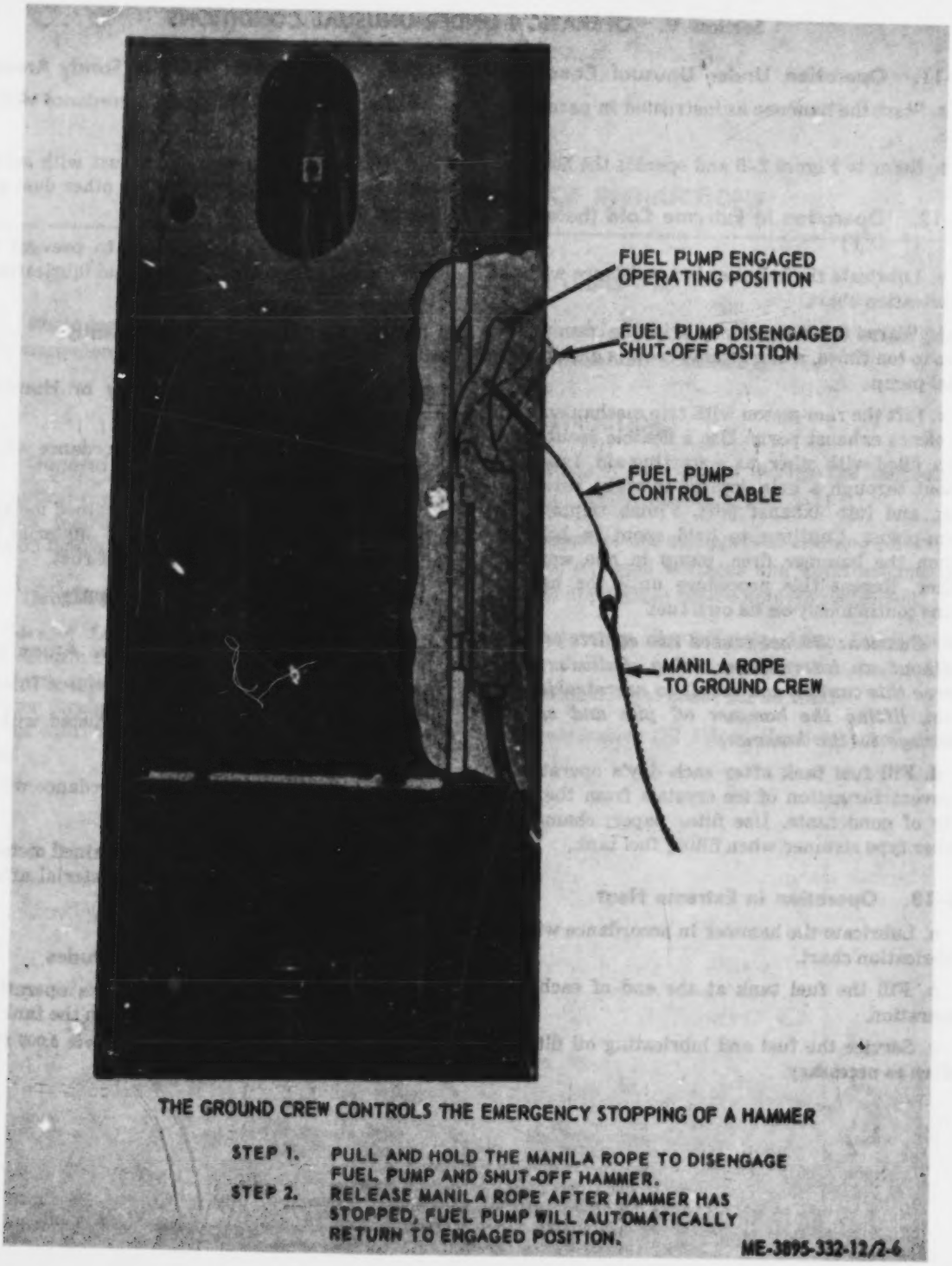

FUEL PUMP ENGAGED
OPERATING POSITION
FUEL PUMP DISENGAGED
SHUT-OFF POSITION
FUEL PUMP
CONTROL CABLE
MANILA ROPE
TO GROUND CREW
THE GROUND CREW CONTROLS THE EMERGENCY STOPPING OF A HAMMER
STEP 1. PULL AND HOLD THE MANILA ROPE TO DISENGAGE FUEL PUMP AND SHUT-OFF HAMMER.
STEP 2. RELEASE MANILA ROPE AFTER HAMMER HAS STOPPED, FUEL PUMP WILL AUTOMATICALLY RETURN TO ENGAGED POSITION.
ME-3895-332-12/2-6

Figure 2–6. Emergency stopping of hammer.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2–11. Operation Under Unusual Conditions

a. Start the hammer as instructed in paragraph 2–8.

b. Refer to Figure 2–5 and operate the hammer.

2–12. Operation in Extreme Cold (below 0°F)

a. Lubricate the hammer in accordance with the lubrication chart.

b. Warm the hammer by tripping ram-piston, five to ten times, while ground crew is disengaging fuel pump.

c. Lift the ram-piston with trip mechanism until it clears exhaust ports. Use a flexible spout pump can, filled with ether, as a starting aid. Insert the spout through a hole, located in right rear cowling, and into exhaust port. Finish tripping the ram-piston. Continue to hold spout in hole and when the hammer fires, pump in one squirt of ether. Repeat this procedure until the hammer runs continuously on its own fuel.

Caution: Do not exceed two squirts of ether without an intermittent firing. Failure to observe this caution can result in overstroking the ram, lifting the hammer off pile and causing damage to the hammer.

d. Fill fuel tank after each day's operation to prevent formation of ice crystals from the freezing of condensate. Use filter paper, chamois, or other type strainer when filling fuel tank.

2–13. Operation in Extreme Heat

a. Lubricate the hammer in accordance with the lubrication chart.

b. Fill the fuel tank at the end of each day's operation.

c. Service the fuel and lubricating oil filters as often as necessary.

2–14. Operation in Dusty or Sandy Areas

a. Lubricate the hammer in accordance with the lubrication chart.

b. Protect the hammer from dust with screens, shelters built from tarpaulins, or other dust proof material.

c. Take adeqaute precautions to prevent sand and dirt from entering the fuel and lubricating oil tank.

d. Service the filters more frequently.

2–15. Operation under Rainy or Humid Conditions

a. Lubricate the hammer in accordance with the lubrication chart.

b. Coat exposed polished or machined metal surfaces with a suitable rust-proof material after first removing any accumulation of rust.

c. Service the filters more frequently.

2–16. Operation in Salt Water Areas

a. Wipe the hammer dry at frequent intervals.

b. If the hammer becomes encrusted with salt, wash it with fresh water.

c. Lubricate the hammer in accordance with the lubrication chart.

d. Coat exposed polished or machined metal surfaces with a suitable rustproof material after removing any accumulation of rust.

2–17. Operation at High Altitudes

Fill the fuel tank after each day's operation to prevent condensation of moisture in the tank.

Note. For high altitude operation (above 4,000 ft.) use No. 2 diesel fuel, VV–F–800–DF–2.

CHAPTER 3

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. BASIC ISSUE ITEMS

3–1. Basic Issue Items.

Tools, equipment and repair parts issued with or authorized for the hammer are listed in the Basic Issue Items List, Appendix C.

Section II. LUBRICATION INSTRUCTIONS

3–2. General Lubrication Information

This section contains a lubrication chart and lubrication instructions. The lubrication chart is shown on figure 3–1.

3–3. Detailed Lubrication Information

a. Care of Lubricants. Keep all lubricants in closed containers and store in a clean, dry place away from external heat. Allow no dust, dirt or any other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.

b. Points of Lubrication. Service the lubrication points at proper intervals. (fig. 3–1)

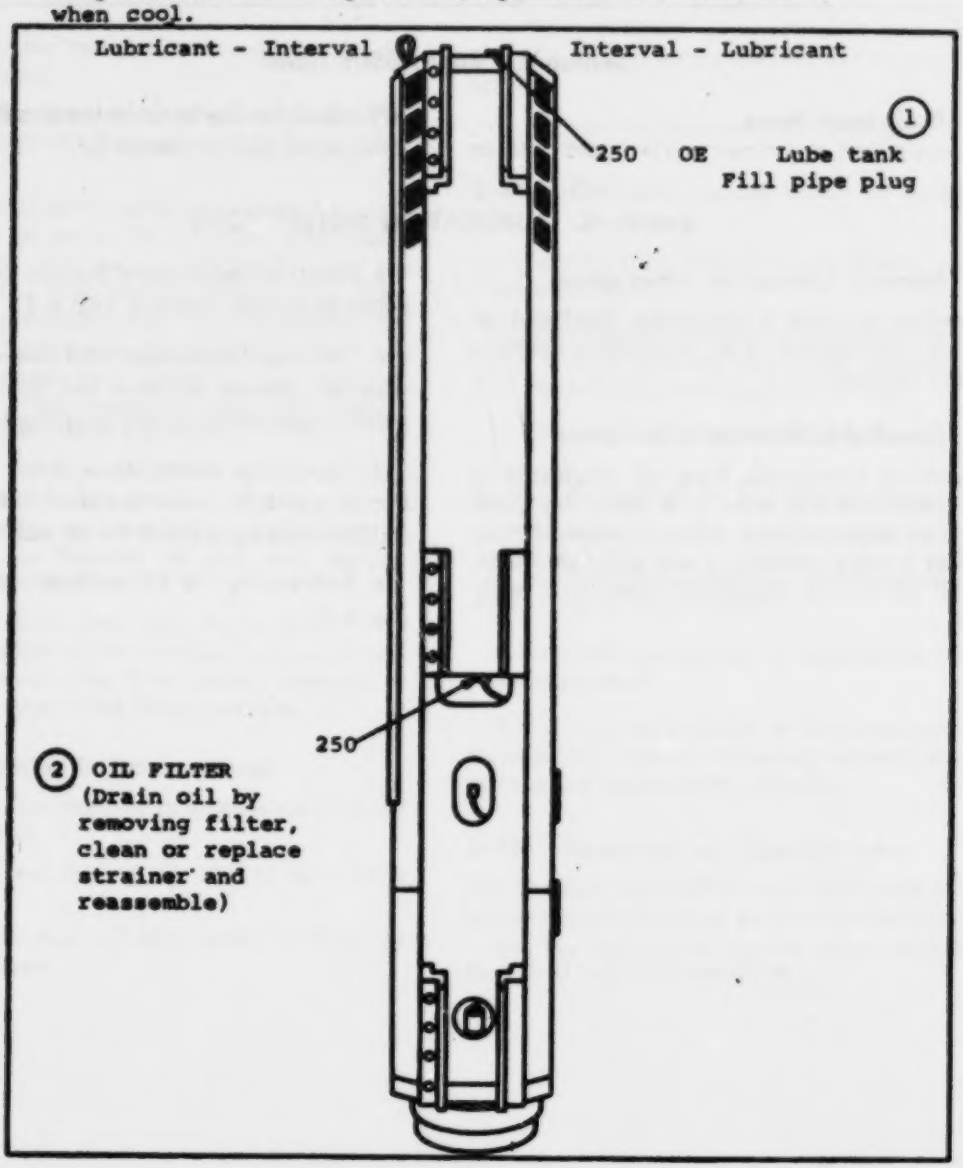
c. Cleaning. Use an approved cleaning solvent to wipe all external surfaces and clean around the point of application before applying lubricant.

d. Operation Immediately After Lubrication. Perform a visual inspection of oil lines and around oil filter housing to check for oil leaks.

e. Lubricating Oil Filter. Service the oil filter. (fig. 3–2)

LUBRICATION

Intervals are based on normal operations. Reduce to compensate for abnormal operation and sever conditions. During inactive periods sufficient lubrication must be preformed for adequate preservation. Clean parts with SOLVENT,dry-cleaning or with OIL,diesel,fuel. Dry before lubricating. Drain crankcase only when hot after operation,replentish and check level when cool.

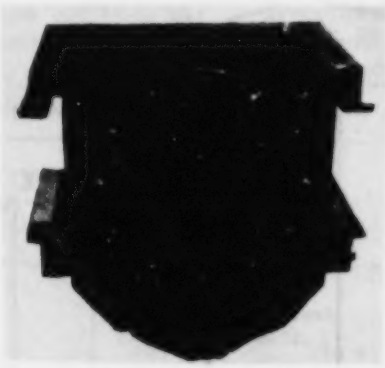

Lubricant - Interval
Interval - Lubricant
1
250 OE Lube tank Fill pipe plug
250
2 OIL FILTER (Drain oil by removing filter, clean or replace strainer and reassemble)

ME-3895-332-12/3-1①

Figure 3-1①. Lubrication chart.

CONTINUED FROM PRECEDING PAGE
- KEY -

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVAL
		ABOVE +32°F	+40°F TO -10F	0°F TO -65F	
OE-OIL, ENGINE, HEAVY DUTY	11 GAL.	OE-40 OR 9500	OE-30 OR 9250	OE-30 OR 9250	INTERVALS GIVEN ARE IN HOURS OF NORMAL OPERATION.



REF. 1 LUBE TANK FILL PIPE PLUG

NOTES:

1. FOR OPERATION OF EQUIPMENT IN TEMPERATURES ABOVE + 32° F. REMOVE LUBRICATING OIL OE-30 OR 9250. CLEAN PARTS WITH SOLVENT, DRY CLEANING. RELUBRICATE WITH OE-40 OR 9500.

2. OIL CAN POINTS. EVERY 250 HOURS, CLEAN AND LIGHTLY COAT ALL LINKAGES.

3. OIL FILTER. AFTER INSTALLING FILTER STRAINER, FILL HAMMER WITH OIL, OPERATE FOR 5 MINUTES, CHECK FOR LEAKS, CHECK OIL TANK LEVEL.

ME 3895-332-12/3-1②

Figure 3-1①. Lubrication chart.

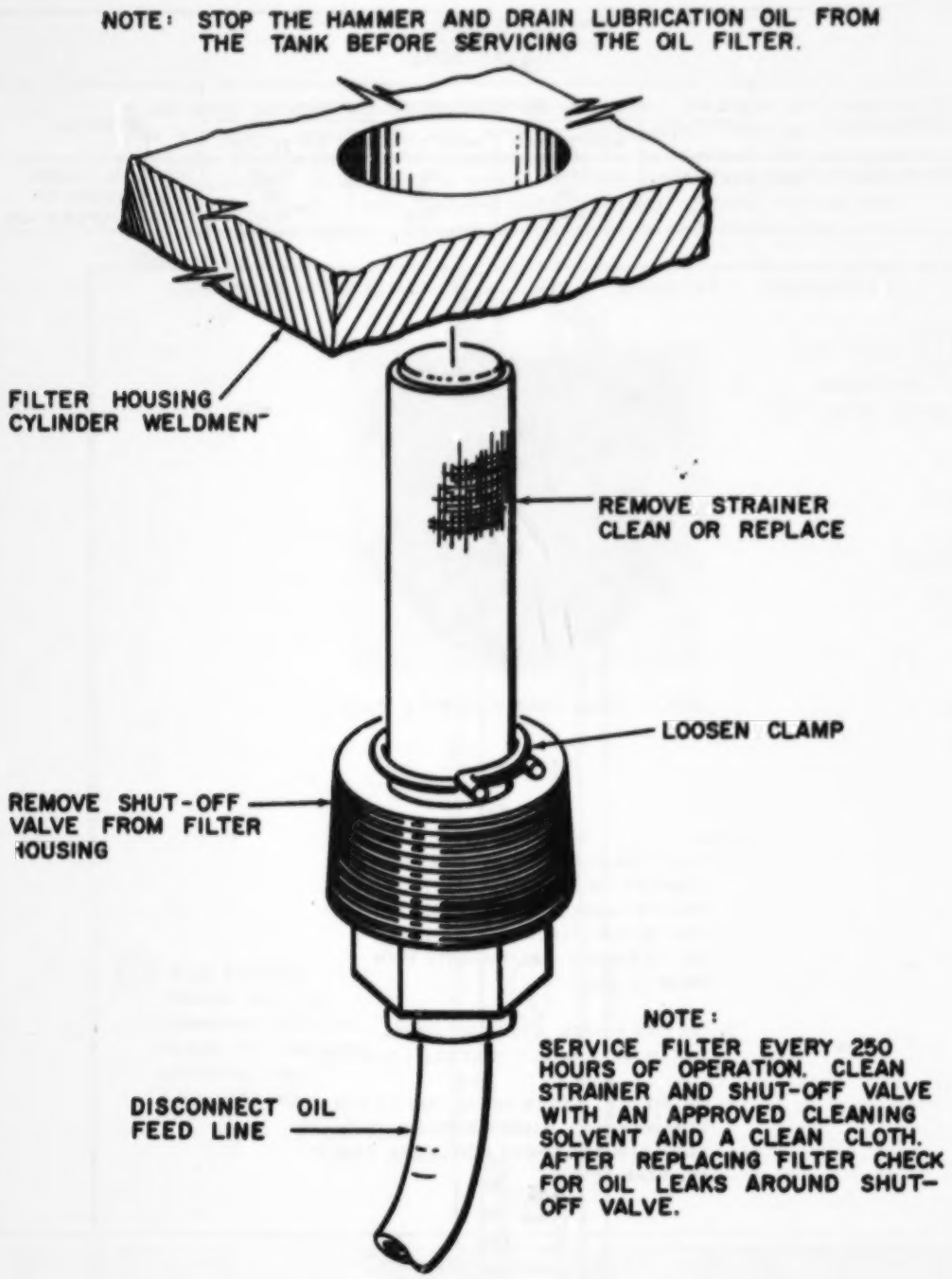

NOTE: STOP THE HAMMER AND DRAIN LUBRICATION OIL FROM THE TANK BEFORE SERVICING THE OIL FILTER.
FILTER HOUSING CYLINDER WELDMEN
REMOVE STRAINER CLEAN OR REPLACE
LOOSEN CLAMP
REMOVE SHUT-OFF VALVE FROM FILTER HOUSING
DISCONNECT OIL FEED LINE
NOTE:
SERVICE FILTER EVERY 250 HOURS OF OPERATION. CLEAN STRAINER AND SHUT-OFF VALVE WITH AN APPROVED CLEANING SOLVENT AND A CLEAN CLOTH. AFTER REPLACING FILTER CHECK FOR OIL LEAKS AROUND SHUT-OFF VALVE.
ME-3895-332-12/3-2

Figure 3-2. Oil filter service.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3–4. General

To insure that the hammer is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed in paragraph 3–5. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 at the earliest possible opportunity.

3–5. Daily Preventive Maintenance Checks and Services

This paragraph contains a tabulated listing of preventive maintenance services which must be performed by the operator. (table 3–1)

Table 3–1. Preventive Maintenance Checks and Services

Item Number	Interval						Item to be Inspected	Procedure	Reference
	Operator				Org.				
	Daily			W	M	Q			
	B	D	A						
1.	x						Fuel Tank.	Add fuel as required.	
2.	x						Lub. Oil Tank.	Add oil as required.	
3.	x	x					Fuel Filter.	Tighten shutoff valve, if leaking.	3–8
4.				x			Fuel Pump.	Clean check valve.	3–10
5.	x	x					Lub. Oil Filter.	Tighten shutoff valve ,if leaking.	3–9
6.				x			Trip Mechanism.	Check trip mechanism and pendant line for wear.	Fig. 2–5
7.	x	x					All Items.	Check for looseness and observe for any unusual noise or vibration.	

Section IV. TROUBLESHOOTING

3–6. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the hammer and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of Operator/Crew maintenance shall be reported to Organizational Maintenance.

Troubleshooting Chart

Malfunction	Probable cause	Corrective action
1. Hammer hard to start or fails to start.	a. Empty fuel tank.	a. Fill fuel tank. (para 3–5)
	b. Water in fuel.	b. Drain and refill fuel tank.
	c. Fuel filter clogged.	c. Clean filter (para 3–8c)
	d. Fuel pump clogged.	d. Clean check valve (para 3–10)
	e. Excess fuel in combustion chamber.	e. Drop ram-piston four or five times with fuel off. (para 2–8b)
2. Hammer misses or runs erratically.	a. Low on fuel.	a. Fill fuel tank. (para 3–5)
	b. Water in fuel.	b. Drain and refill fuel tank. (para 3–5)
	c. Fuel pump clogged.	c. Clean check valve. (para 3–10)
	d. Excess fuel.	d. Fuel pump check valve, clean or replace. (para 3–10)
3. Hammer stops suddenly.	a. No fuel.	a. Fill fuel tank. (para 3–5)
	b. Fuel pump check valve.	b. Clean; if damaged replace. (para (3–10)
	c. Fuel filter clogged.	c. Clean filter. (para 3–8c)
4. Hammer overheats.	a. No lubricating oil.	a. Fill oil tank. (para 3–5)
	b. Lubricating oil filter clogged.	b. Clean filter. (para 3–9c)
5. Hammer exhaust smoke excessive.	Excess fuel.	Check transmitter pressure gauge — maintain 90 to 100 P.S.I. (para 2–6b)

Section V. MAINTENANCE OF FUEL FILTER LUBRICATING OIL FILTER AND FUEL PUMP

3–7. General

The instructions in this section are published for the information and guidance of the operator to maintain the hammer.

3–8. Fuel Filter and Shutoff Valve Service

a. Removal.

(1) Drain fuel tank.

(2) Remove filter. (fig. 3–3)

b. Disassembly. Disassemble the fuel filter and shutoff valve. (fig. 3–4)

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks, and other damage. Replace defective parts.

(3) Replace fuel strainer if necessary.

d. Reassembly. Reassemble fuel filter and shutoff valve. (fig. 3–4)

e. Installation.

(1) Install Fuel filter and shutoff valve. (fig. 3–3)

(2) Refill fuel tank.

(3) Tighten shutoff valve if leaking.

3–9. Lubricating Oil Filter and Shutoff Valve Service

a. Removal.

(1) Drain oil from tank.

(2) Remove oil filter and shutoff valve. (fig. 3–5)

b. Disassembly. Disassemble the oil filter and shutoff valve. (fig. 3–6)

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks, wear and other damage. Replace defective parts.

(3) Replace oil strainer if necessary.

d. Reassembly. Reassemble the oil filter and shutoff valve. (fig. 3–6)

e. Installation.

(1) Install oil filter and shutoff valve. (fig. 3–5)

(2) Refill lubricating oil tank.

(3) Tighten shutoff valve if leaking.

3–10. Fuel Pump Service

Service the fuel pump check valve and orifice. (fig. 3–7)

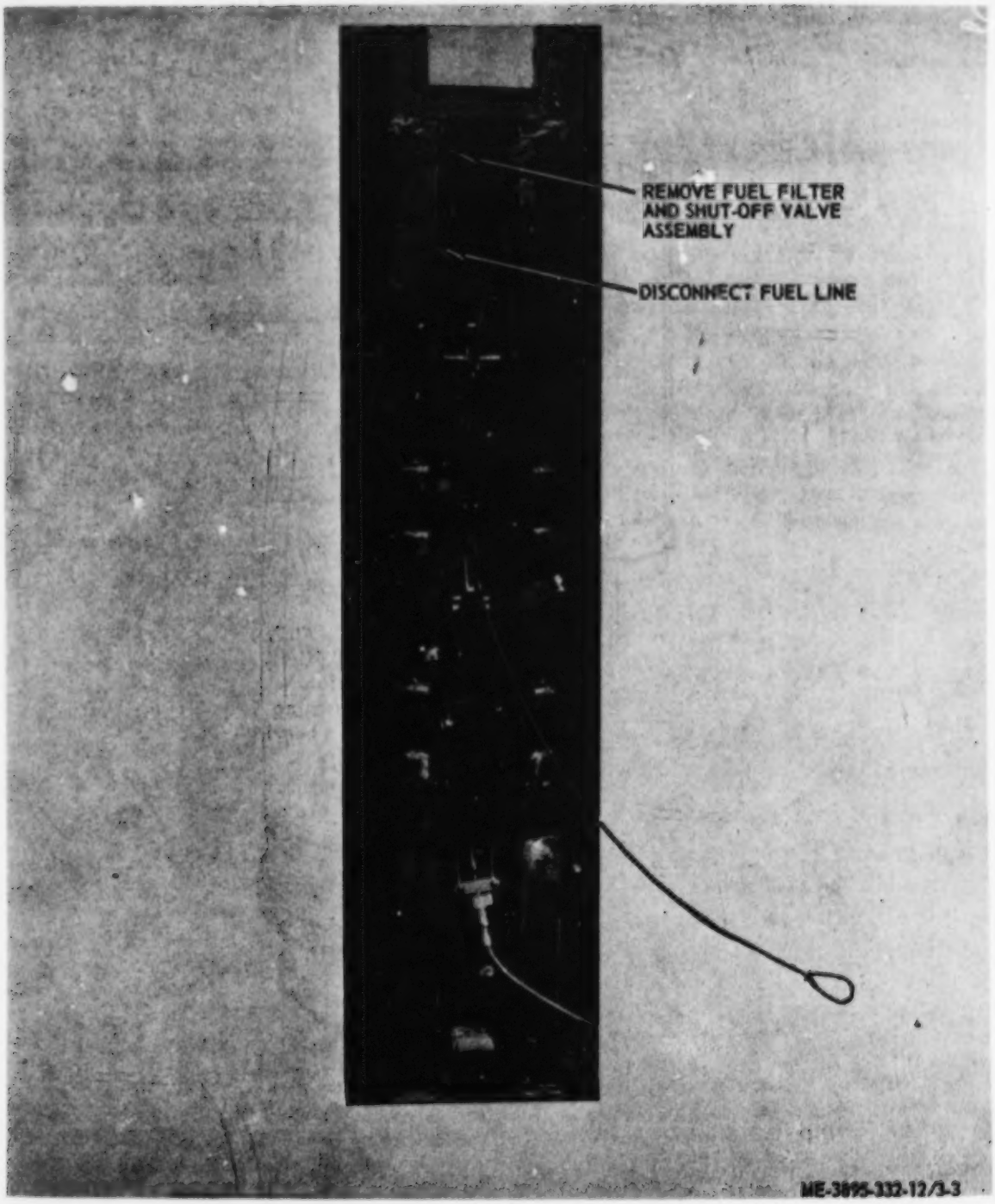
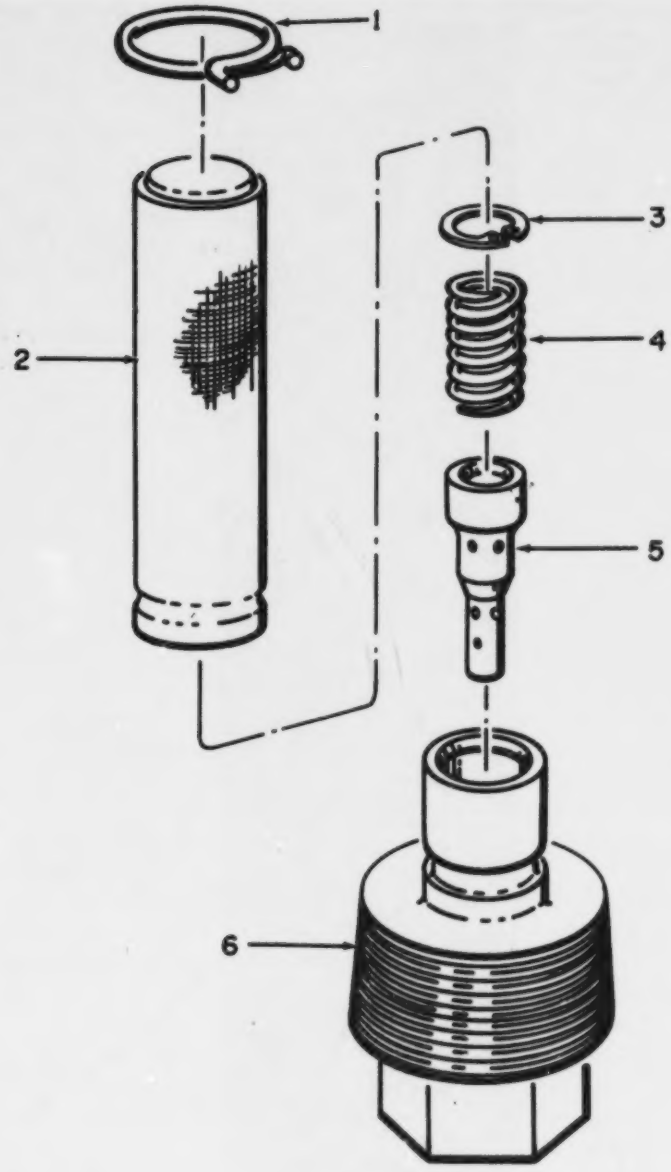


Figure 3–3. Fuel filter and shutoff valve assembly, removal and installation.



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1. Clamp, loop 2. Strainer 3. Ring, retainer 4. Spring 5. Valve, check 6. Housing, valve

Figure 3-4. Fuel filter and shutoff valve, exploded view.

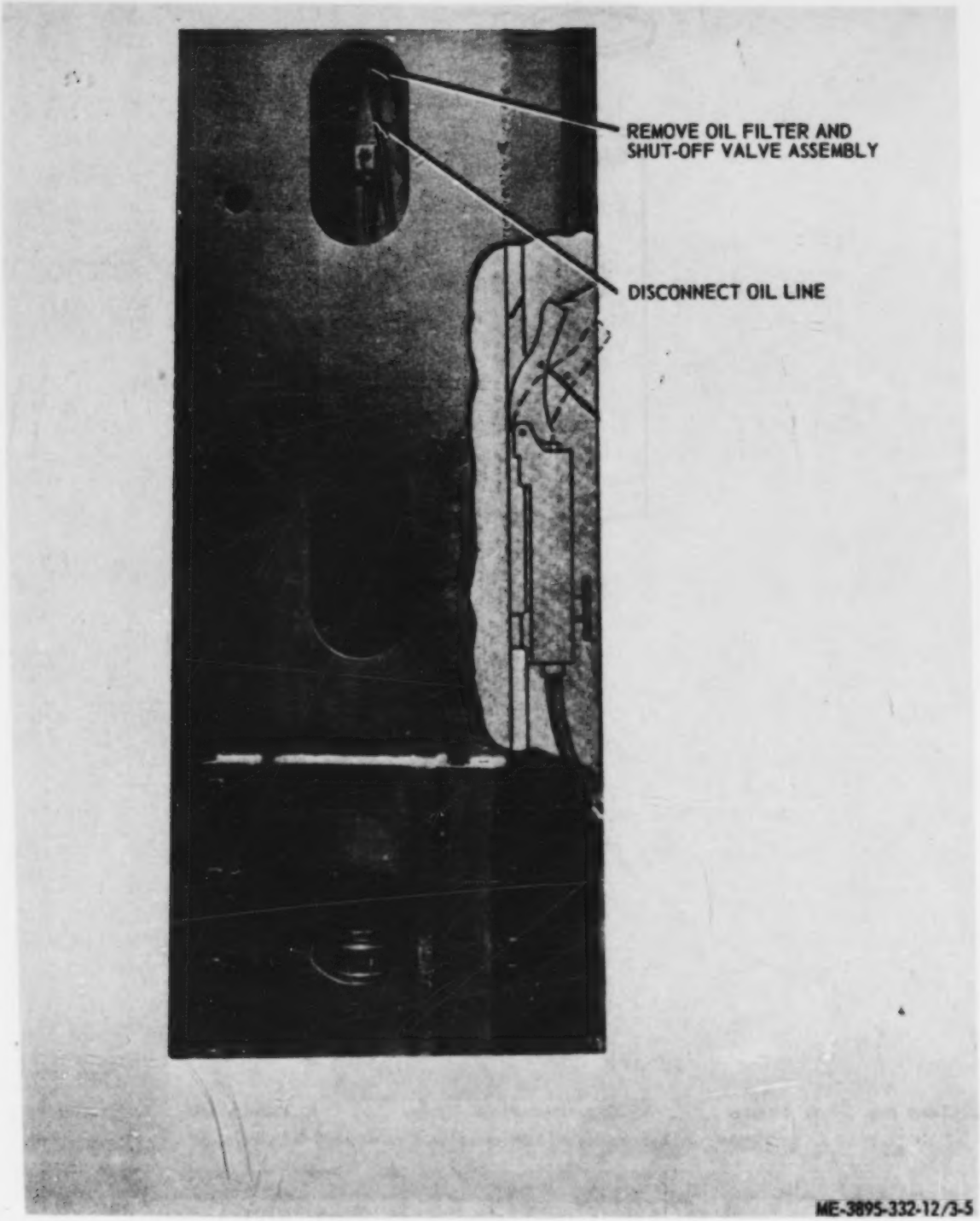
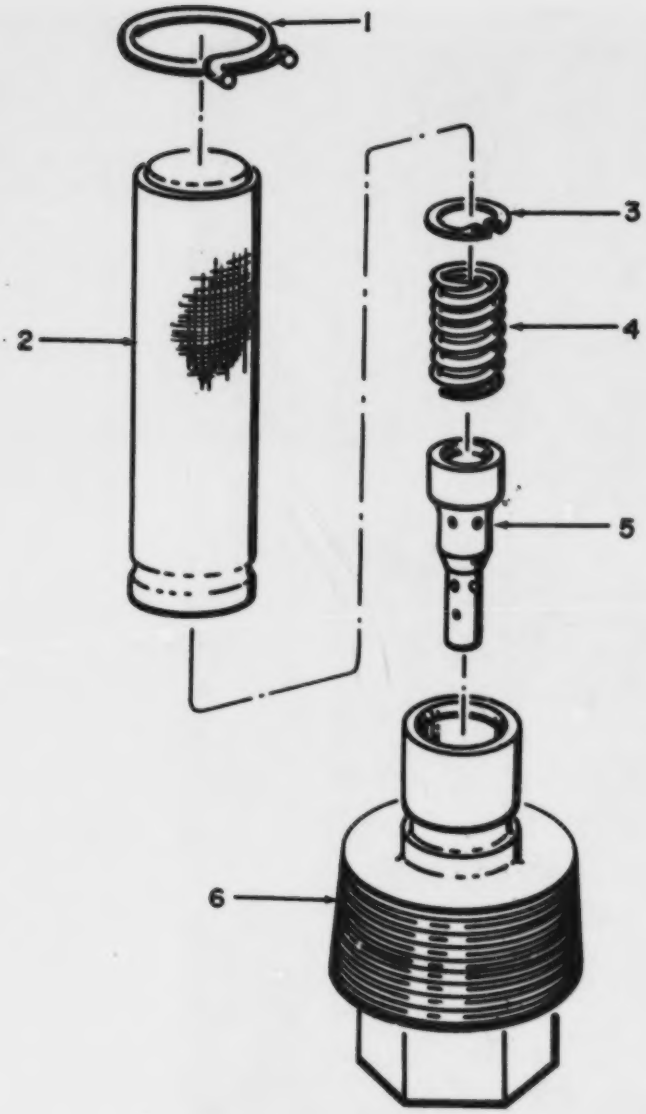


Figure 3–5. Lubricating oil filter and shutoff valve assembly, removal and installation.



1. Clamp, loop 2. Strainer 3. Ring, retainer 4. Spring 5. Valve, check 6. Housing, valve

Figure 3–4. Lubricating oil filter and shutoff valve, exploded view.

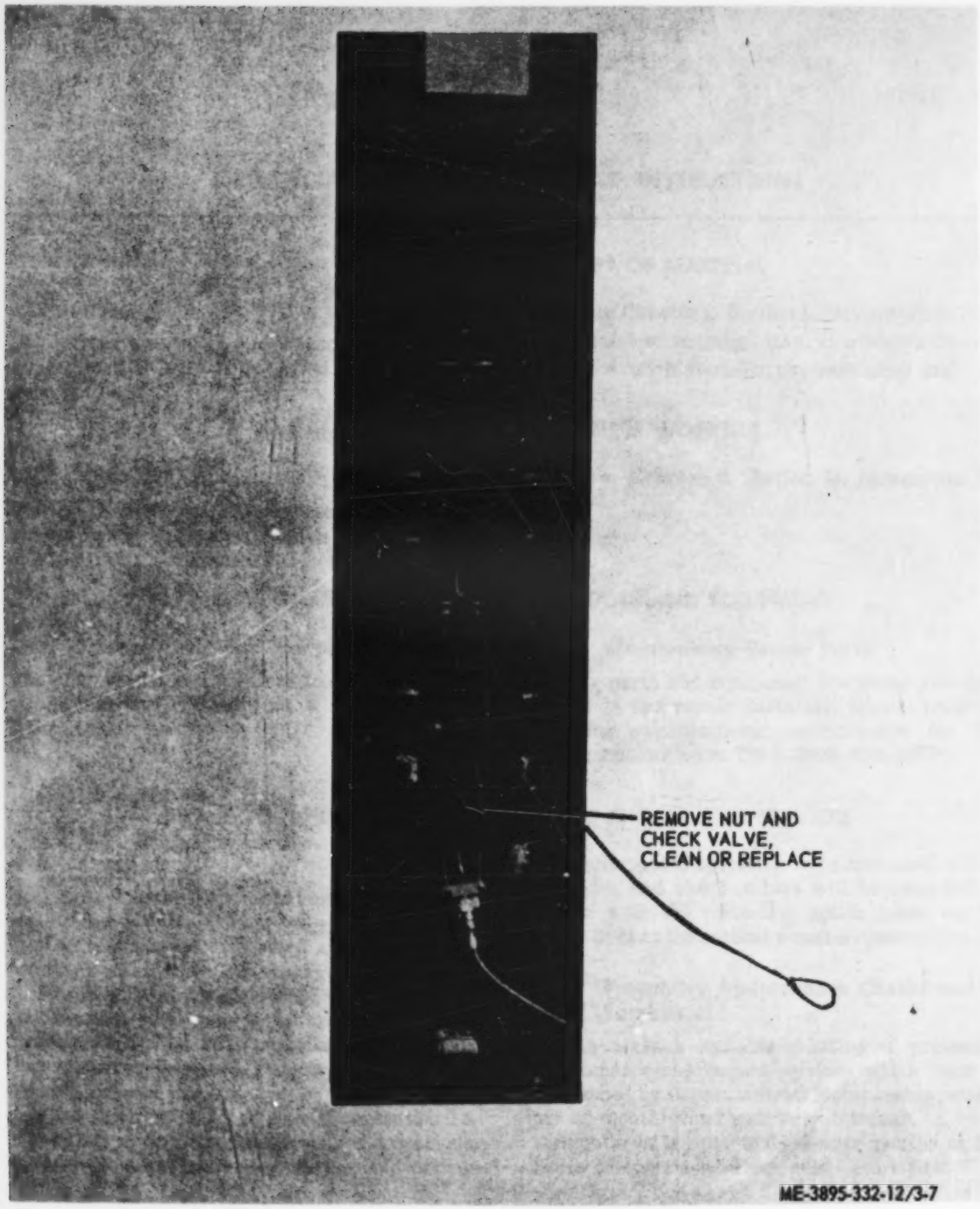


Figure 3–7. Fuel pump check valve service.

CHAPTER 4
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

4–1. General

The instructions which apply here are the same as appear in the Operator's Section of this manual.

Refer to Chapter 2, Section I, paragraphs 2–1 and 2–2. Refer to technical manual covering destruction of Army Material to prevent enemy use.

Section II. MOVEMENT TO A NEW WORKSITE

4–2. General

The instructions which apply here are the same as appear in the Operator's Section of this manual.

Refer to Chapter 2, Section II, paragraphs 2–3 and 2–4.

Section III. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4–3. Special Tools and Equipment

The only special tool required for this hammer is the Ram Lifting Rod referred to in Appendix C of this manual.

4–4. Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tools list covering organizational maintenance for this equipment located in TM 5–3895–332–125P.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4–5. General

To insure that the hammer is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary Preventive Maintenance Services to be performed are listed in paragraph 4–6. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 at the earliest possible opportunity.

4–6. Preventive Maintenance Checks and Services

This paragraph contains a listing of preventive maintenance checks and services which must be performed by Organizational Maintenance personnel at monthly and quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, which ever occurs first.

Table 4–1. Preventive Maintenance Checks and Services

Item Number	Interval						Item to be inspected	Procedure	Reference
	Operator			Org					
	Daily								
	B	D	A	W	M	Q			
1.						x	Fuel Filter	Drain fuel tank and clean strainer.	3–8a and 3–8c
2.						x	Lub. Oil Filter	Drain oil tank tank and clean strainer.	3–9a and 3–9c
3.					x	x	Terminal Check Valve	Clean.	4–12c
4.					x	x	Fuel Pump Control Cable	Check control cable and manila rope for wear.	Figure 2–3
5.						x	Fuel Tank	Drain and clean.	3–8a
6.						x	Lub. Oil Tank	Drain and clean.	3–9a
7.						x	Trip Mechanism	Check trip mechanism and pendant line for wear.	Figure 2–5

Section V. TROUBLESHOOTING

4–7. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the hammer and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. Possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organizational maintenance shall be reported to Direct and General Support Maintenance.

Troubleshooting Chart

Malfunction	Probable cause	Corrective action
1. Hammer hard to start or fails to start.	a. Fuel line clogged or damaged. b. Fuel pump defective.	a. Clean or replace. (para 4–14) b. Replace fuel pump (para 4–16)
2. Hammer misses or runs erratically.	a. Fuel pump defective.	a. Replace fuel pump (para 4–16)
3. Hammer stops suddenly.	Fuel lines clogged or damaged.	Clean or replace. (para 4–14)
4. Hammer overheats.	a. Lubricating oil lines clogged or damaged. b. Lubricating oil pump defective.	a. Clean or replace. (para 4–9) b. Replace oil pump. (para 4–11)
5. Hammer lacks power.	Fuel pump defective.	Repair or replace. (para 4–16)
6. Trip mechanism will not engage with ram-piston.	a. Safety link broken. b. Spring cap jammed in down position.	a. Replace safety link. (para 4–19) b. Inspect spring; damaged or weak, replace. Inspect spring cap; if worn, replace. (para 4–19)

Section VI. MAINTENANCE OF LUBRICATION SYSTEM

4–8. General

a. The lubrication system consists of the tank which is part of the cylinder weldment, oil lines, oil filter, inline shutoff valve, and lubricating oil pump. Two of the oil lines have terminal check valve which hold back high pressure from the combustion chamber.

b. Oil drains, by gravity flow from tank, through a wire mesh filter and inline shutoff valve, down the inlet line to the top of the lubricating oil pump. The oil feeds through passages in the pump to (4) plungers. On its downward travel, the ram-piston strikes the pump cam and forces the plungers down. As the plungers travel downward, a small amount of oil is pushed past the ball check valves into the oil lines.

4–9. Lubricating Oil Lines

a. Removal. Remove the lubricating oil lines. (fig. 4–1)

b. Disassembly. To disassemble oil line fittings, wire braided teflon hose must be cut with hacksaw

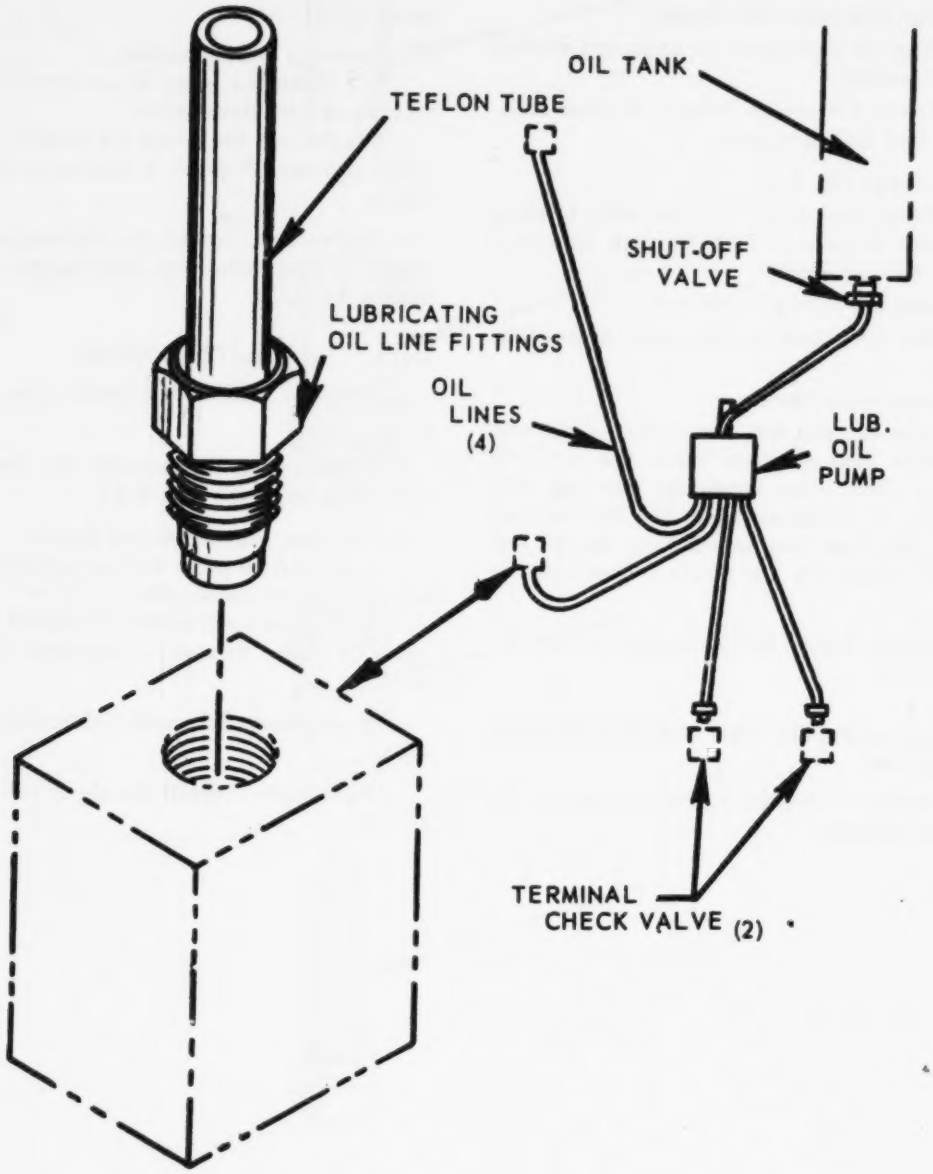


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Figure 4–1. Lubricating oil line, removal and installation.

or tin snips. Insert and ferrule must be discarded, but nut can be used over during reassembly. (fig. 4–2)

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved solvent and dry thoroughly.

(2) Inspect for cracks, breaks, or other damage; replace all defective parts.

d. Reassembly. (fig. 4–2)

(1) Wrap teflon tube (oil line) with friction tape at point to be cut. Saw through tape and teflon tube with hacksaw.

(2) Place the ferrule in the nut.

(3) Push the teflon tube through the nut into the ferrule.

(4) Press in the insert.

(5) Place the nut into the mating piece and tighten. After two or three turns the nut will tighten and then after continued turning, will loosen. This is evidence that the ferrule has crimped as required. Continue to turn the nut one or two more turns. Do not screw it down all the way.

e. Installation. Install the lubricating oil line fittings. (fig. 4–1)

4–10. Lubricating Oil Filter and Shutoff Valve Service

Refer to Chapter 2, Section V, Paragraph 3–9 for removal and service.

4–11. Lubricating Oil Pump

a. Removal. Remove the lubricating oil line, see Paragraph 4–9*a*, and remove the lubricating oil pump. (fig. 4–3)

b. Cleaning and Inspection.

(1) Clean the pump in an approved cleaning solvent and dry thoroughly.

(2) Inspect the pump for cracks, breaks and other damage. Replace a damaged or defective pump.

c. Installation. Install the lubricating oil pump (fig. 4–3) and install the Lubricating oil line, see paragraph 4–9*e*.

4–12. Terminal Check Valve

a. Removal. Remove the check valve. (fig. 4–1 & 4–4)

b. Disassembly. Disassemble the check valve in numerical sequence. (fig. 4–5)

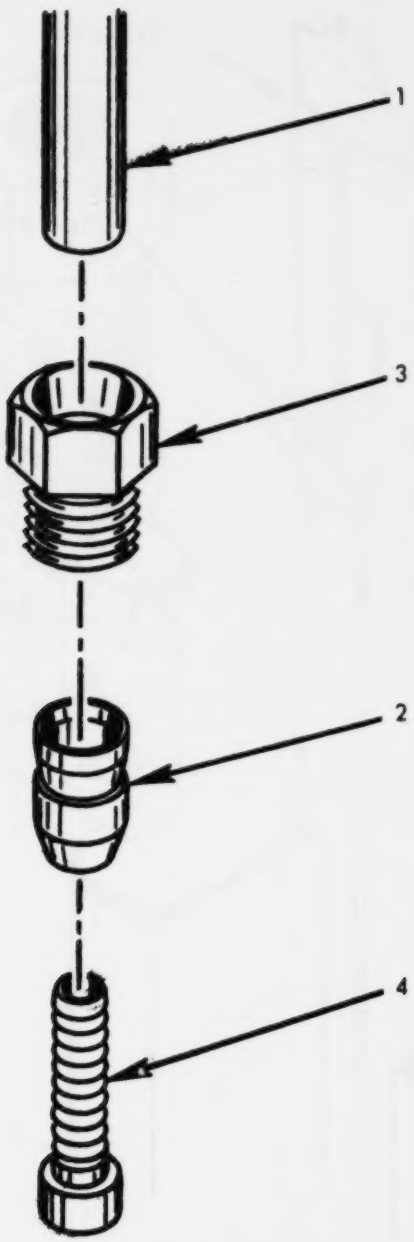
c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks, or other damage. Replace a damaged or defective part.

d. Reassembly. Reassemble the check valve. (fig. 4–5)

e. Installation. Install the check valve. (fig. 4–1 & 4–4)



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1. Teflon tube, oil lines (5 reqd)
2. Ferrule, coupling (10 reqd)
3. Inverted nut, tubing (10 reqd)
4. Insert, tubing coupling (10 reqd)

Figure 4–2. Lubricating oil line fittings, exploded view.

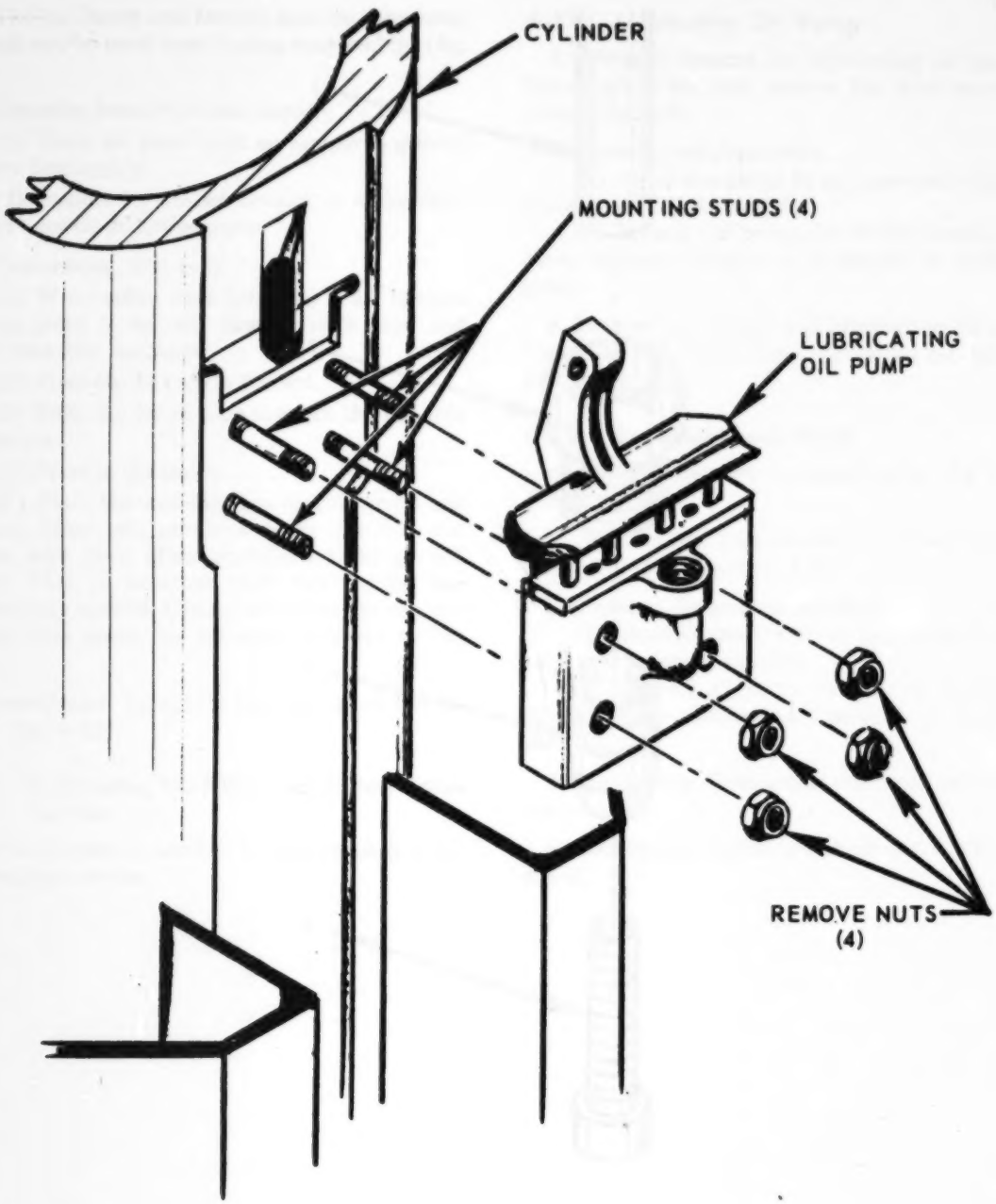

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Figure 4–3. Lubricating oil pump, removal and installation.

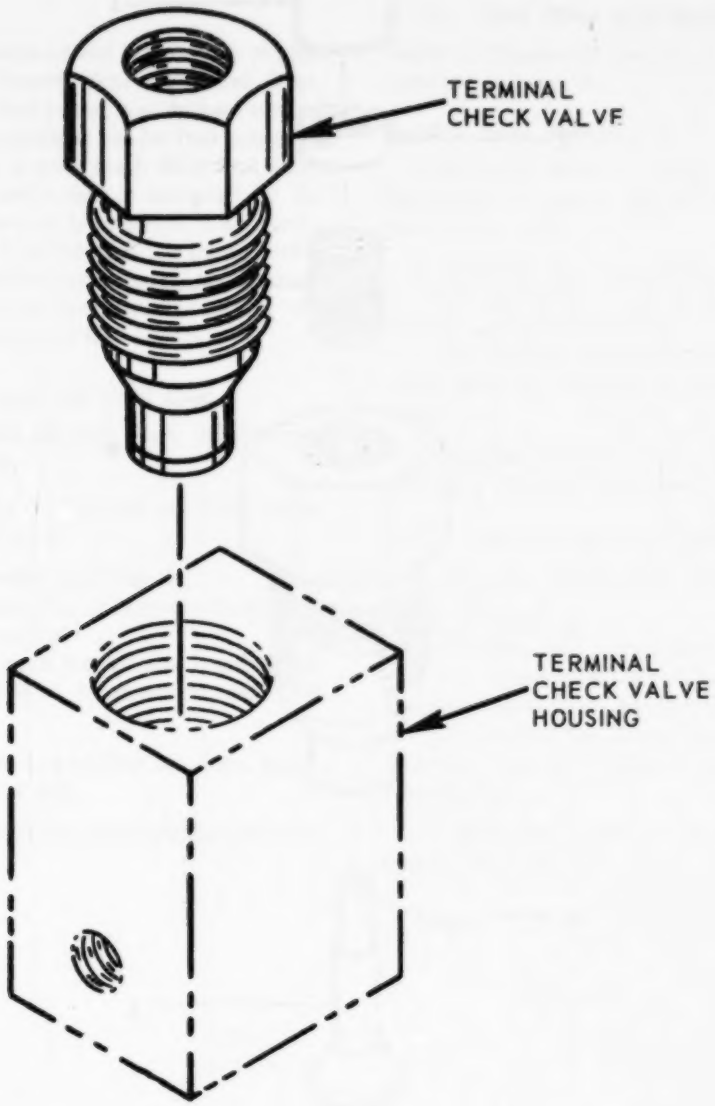

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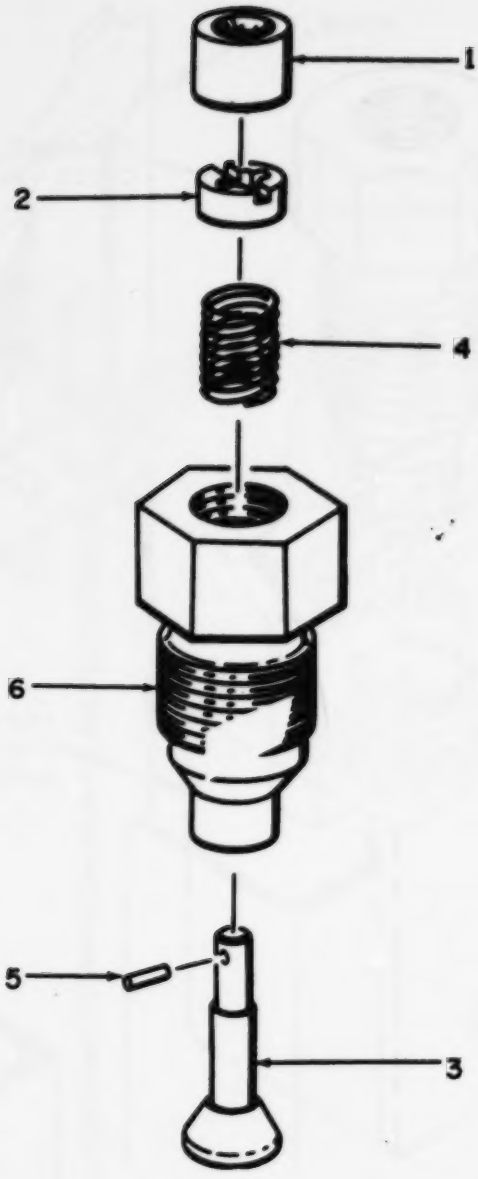
Figure 4–4. Terminal check valve, removal and installation.



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1. Insert, screw thread
2. Washer, keyway
3. Plunger, detent
4. Spring
5. Pin, straight, headless
6. Housing, valve

Figure 4–5. Terminal check valve, exploded view.

Section VII. MAINTENANCE OF FUEL SYSTEM

4–13. General

The fuel system consists of the tank which is part of the cylinder weldment, fuel lines, fuel filter, inline shutoff valve, fuel pump, and remote control transmitter. Fuel is supplied to the fuel pump by gravity flow through a wire mesh filter and shutoff valve. The fuel pump cam is actuated by the ram-piston. When the cam is actuated it delivers a measured amount of fuel through the pump orifice into the anvil cup. The remote control transmitter controls the amount of fuel by controlling the amount bypassed within the fuel pump.

4–14. Fuel Lines and Air Vent Line

a. Removal. Remove the fuel lines, fittings and air vent line. (fig. 4–6)

b. Disassembly. See lubricating oil lines, paragraph 4–9b, and figure 4–2.

c. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks, and other damage. Replace a damaged or defective part.

d. Reassembly. See lubricating oil lines, paragraph 4–9*d* and figure 4–2.

e. Installation. Install the fuel lines and air vent line. (fig. 4–6)

4–15. Fuel Filter and Shutoff Valve

Refer to Chapter 3, Section V, Paragraph 3–8 for removal and service.

4–16. Fuel Pump

a. Removal. Remove access cover. Remove fuel lines, see paragraph 4–14*a*, and remove the fuel pump. (fig. 4–7)

b. Cleaning and Inspection.

(1) Clean the pump in an approved cleaning solvent and dry thoroughly.

(2) Inspect the pump for cracks, breaks and other damage. Replace a damaged or defective pump.

c. Installation. Install the fuel pump (fig. 4–7), and install the fuel lines, see paragraph 4–14*e*.

4–17. Remote Control Transmitter

a. Removal. Disconnect control hose from fuel pump. (fig. 4–8)

b. Cleaning and Inspection.

(1) Clean the transmitter in an approved cleaning solvent and dry thoroughly.

(2) Inspect the transmitter for cracks, breaks and other damage. Replace a damaged or defective transmitter.

c. Installation. Connect the control hose to fuel pump. (fig. 4–8)

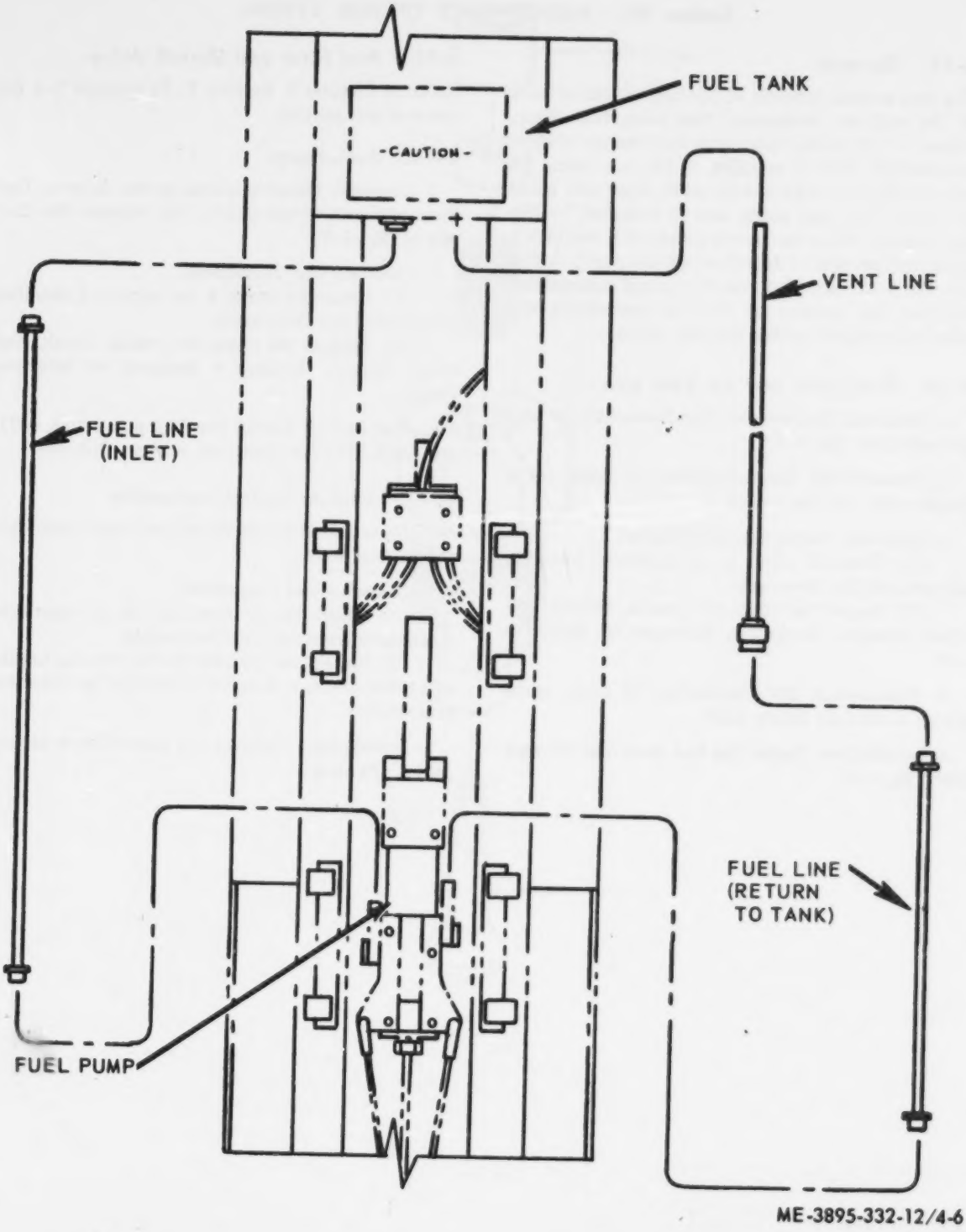


Figure 4–6. Fuel lines, fittings, and air vent line, removal and installation.

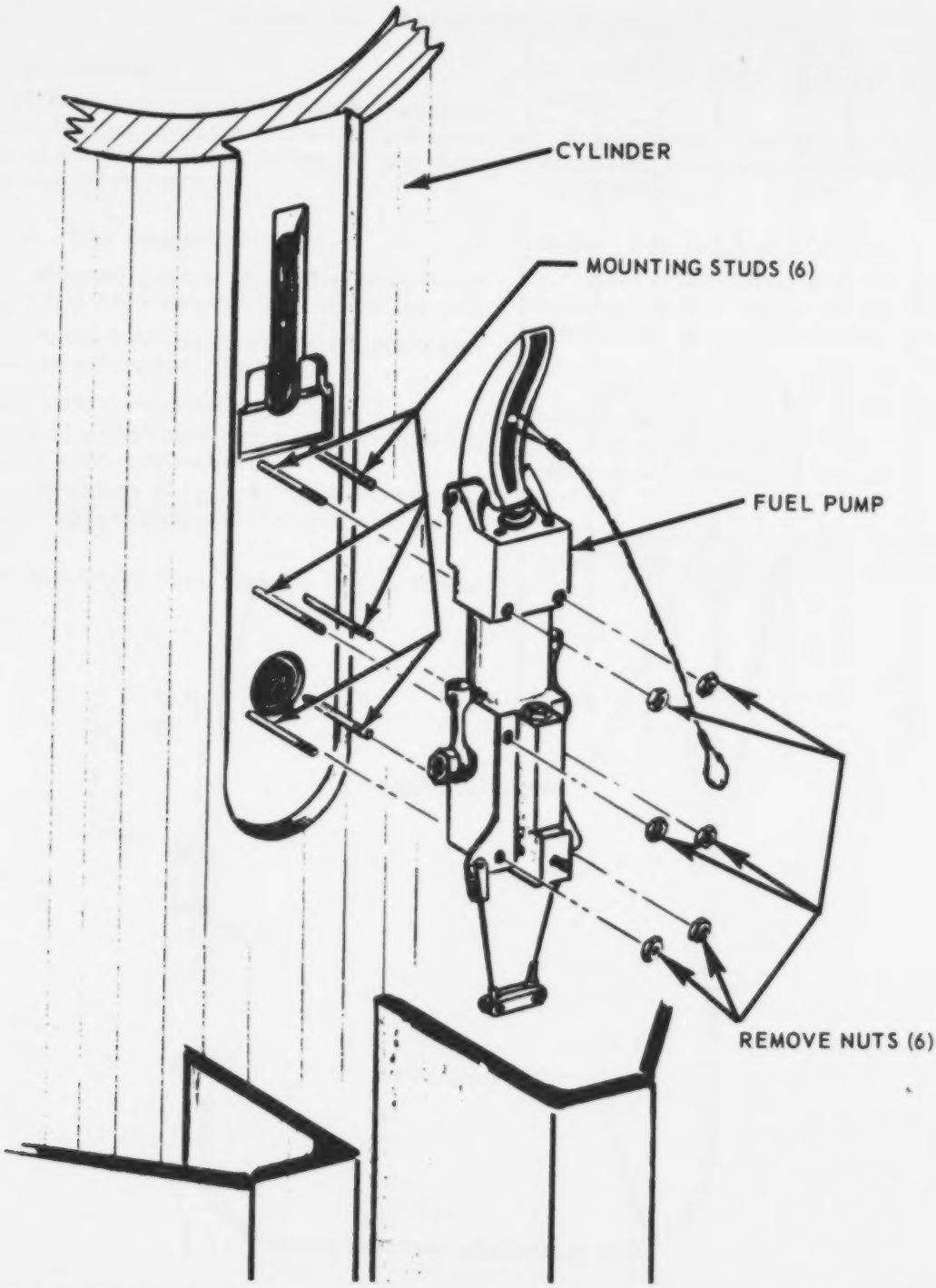


Figure 4–7. Fuel pump, removal and installation.

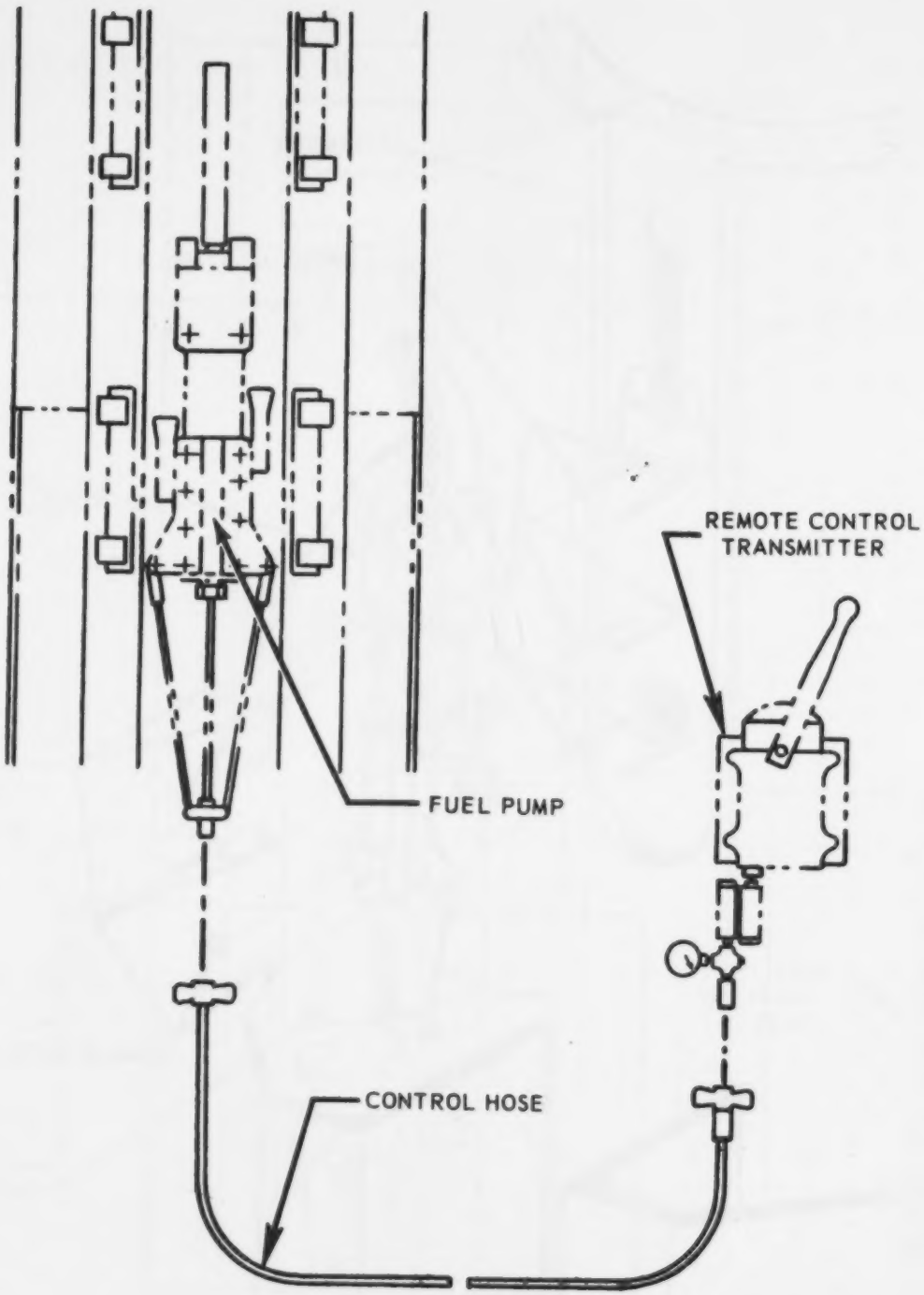


Figure 4–8. Control hose, removal and installation.

Section VII. MAINTENANCE OF TRIP MECHANISM

4–18. General

The trip mechanism is an off-center linkage mechanism designed to engage with a machined shoulder on the ram-piston for lifting the ram-piston and starting the hammer.

4–19. Trip Mechanism

a. Removal. Remove self-locking bolts, access cover, trip mechanism and trip cushion. (fig. 4–9)

b. Disassembly. Disassemble the trip mechanism in numerical sequence. (fig. 4–10)

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for breaks, cracks, and other damage. Replace a damaged or defective part.

d. Reassembly. Reassemble the trip mechanism in the reverse of the numerical sequence. (fig. 4–10)

e. Installation. Install the trip mechanism, trip cushion and access cover and fasten with self-locking bolts. (fig. 4–9)

4–20. Trip Safety Mechanism

a. Removal and Disassembly. This mechanism is assembled directly into the cylinder. Remove and disassemble in numerical sequence. (fig. 4–11)

b. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for breaks, cracks, and other damage. Replace a damaged or defective part.

c. Reassembly and Installation. Reassemble and install in the reverse of the numerical sequence. (fig. 4–11)

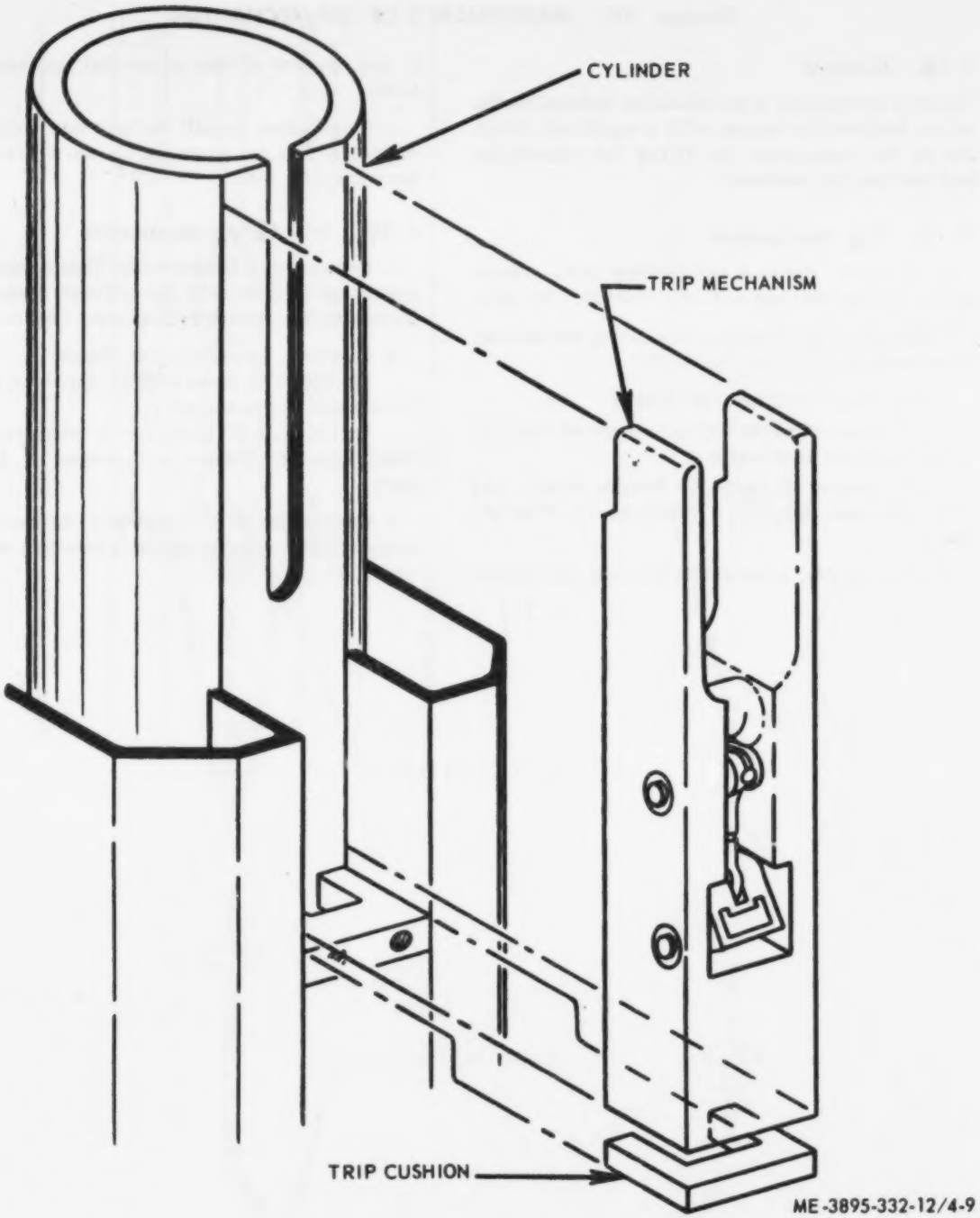
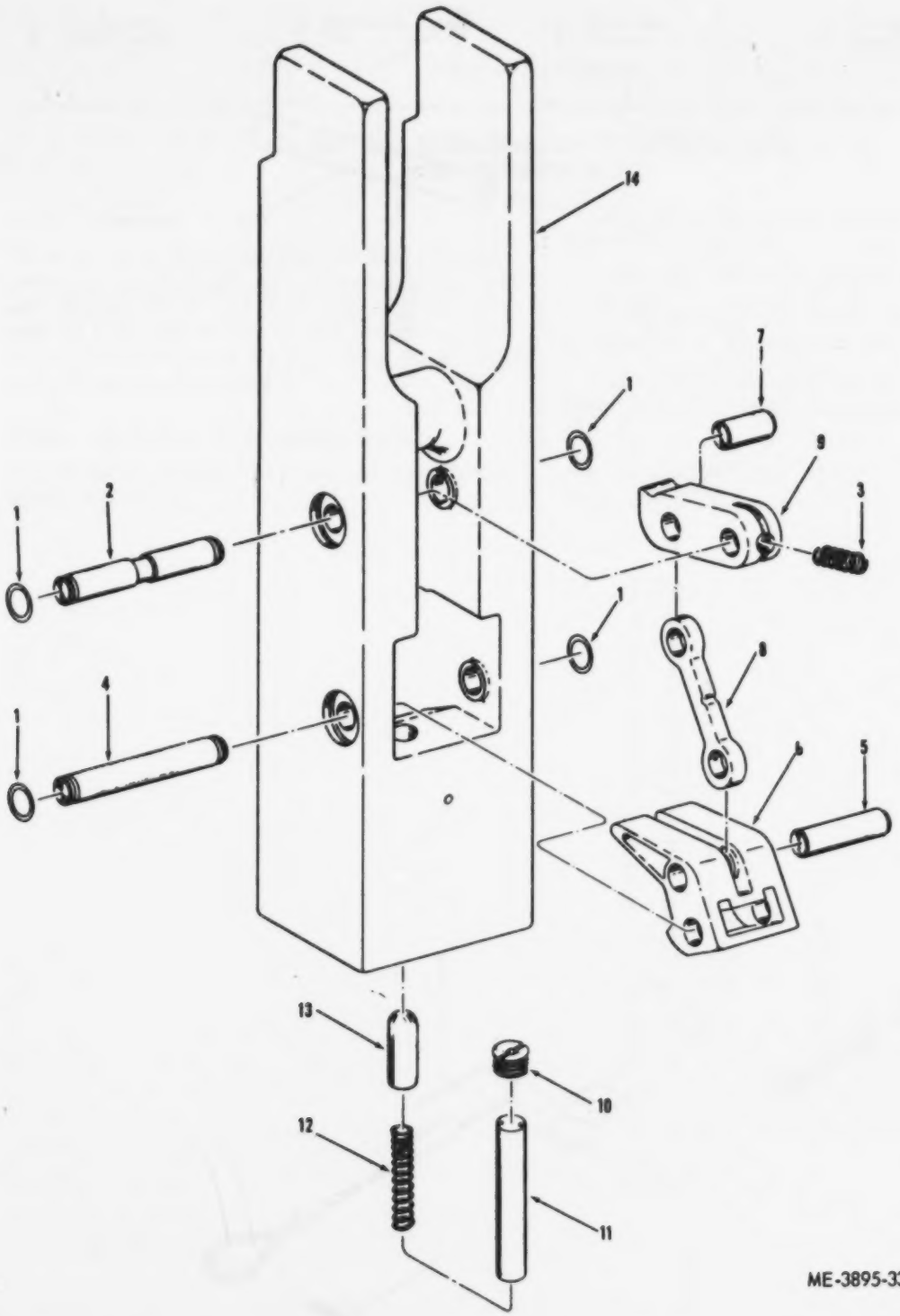


Figure 4–9. Trip mechanism, removal and installation.



1. O Ring (4 Rqr)
2. Safety pivot pin
3. Spring, lifting hook
4. Pivot pin
5. Trip lever pin
6. Trip lever
7. Lifting hook pin
8. Link, safety
9. Lifting hook
10. Plug
11. Rod
12. Spring
13. Spring cap
14. Housing, trip

Figure 4–10. Trip mechanism, exploded view.

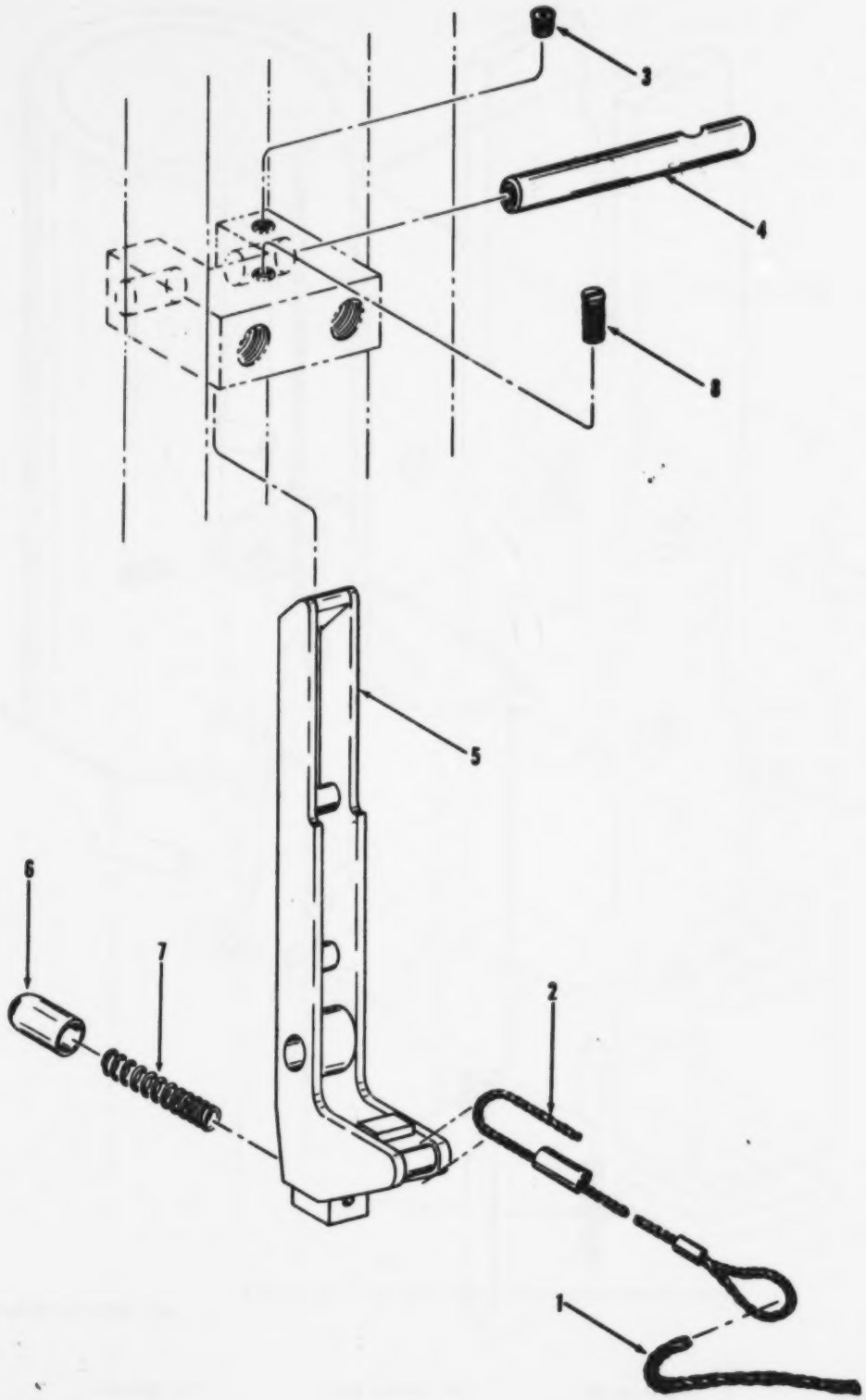


Figure 4–11. Trip safety mechanism, removal and installation, exploded view.

1. Manila rope
2. Control cable
3. Screw, set, soc. hd.
4. Pin
5. Trip stop
6. Plunger
7. Spring
8. Screw, set, soc. hd.

Figure 4–11.—Continued

Section IX. MAINTENANCE OF DRIVING CAPS AND CUSHION BLOCK

4–21. General

There are three drive caps and one filler (one concrete cap, one sheet pile cap, one universal cap and one H-Beam filler). All drive caps are provided with an anvil pocket deep enough to receive a 2 to 2½ inch thick cushion block. A drive cap is used to guide and protect the pile.

4–22. Drive Cap and Cushion Block

a. Removal. Remove the drive cap and cushion block. (fig. 4–12)

Note. All drive caps are removed and installed as illustrated in figure 4–12.

b. Cleaning, Inspection and Repair.

(1) Clean all parts except cushion block with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks and other damage. Replace a damaged or defective part.

c. Installation. Install the drive cap and cushion block. (fig. 4–12)

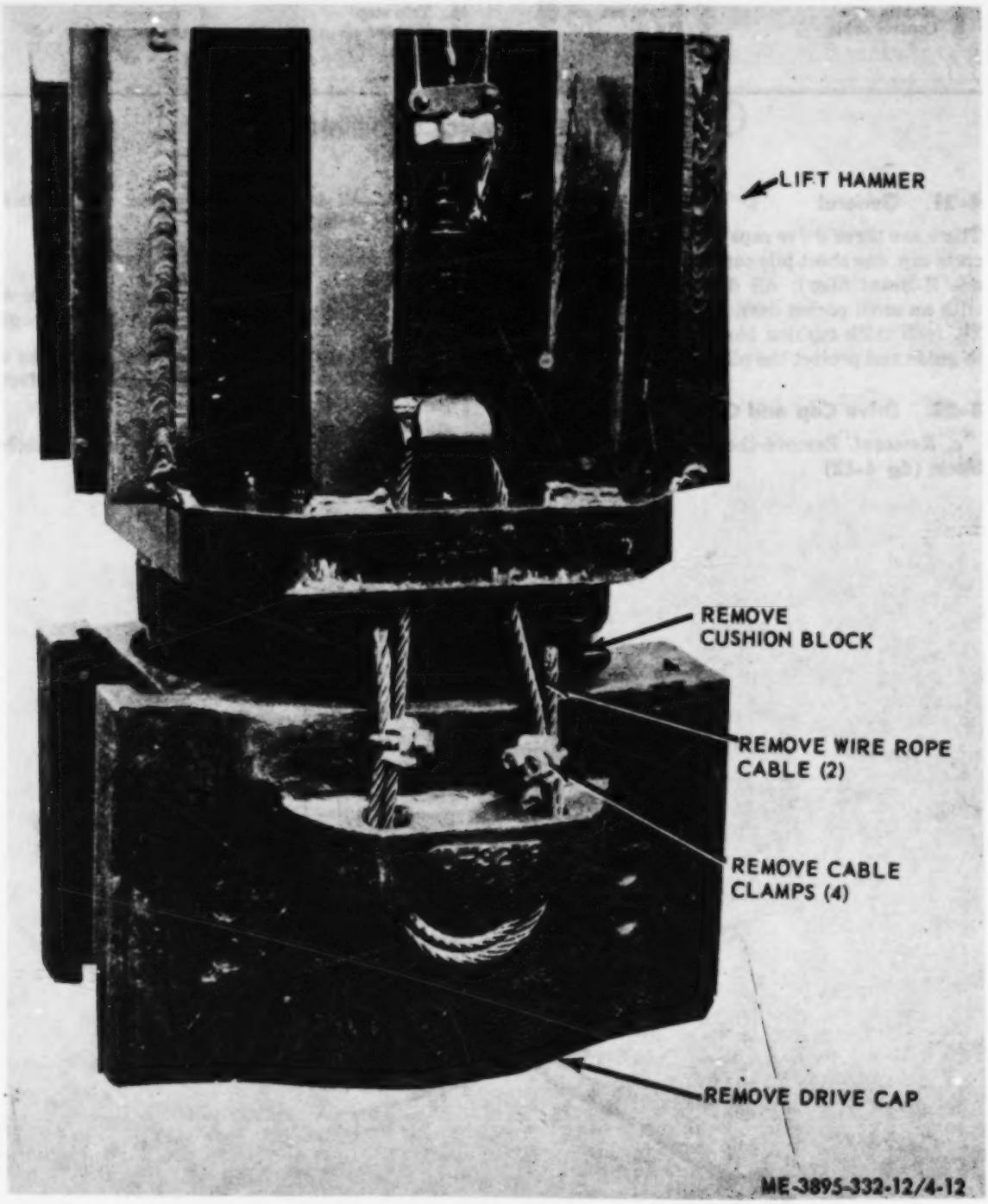


Figure 4–12. Drive cap and cushion block, removal and installation.

Section X. MAINTENANCE OF AIR GAUGE

4–23. General

The air gauge is used to read the air chamber pressure and determine the hammer energy.

4–24. Air Gauge

a. Removal. Disconnect hose from hammer. (fig. 2–3)

b. Disassembly. Disassemble air gauge in numerical sequence. (fig. 4–13)

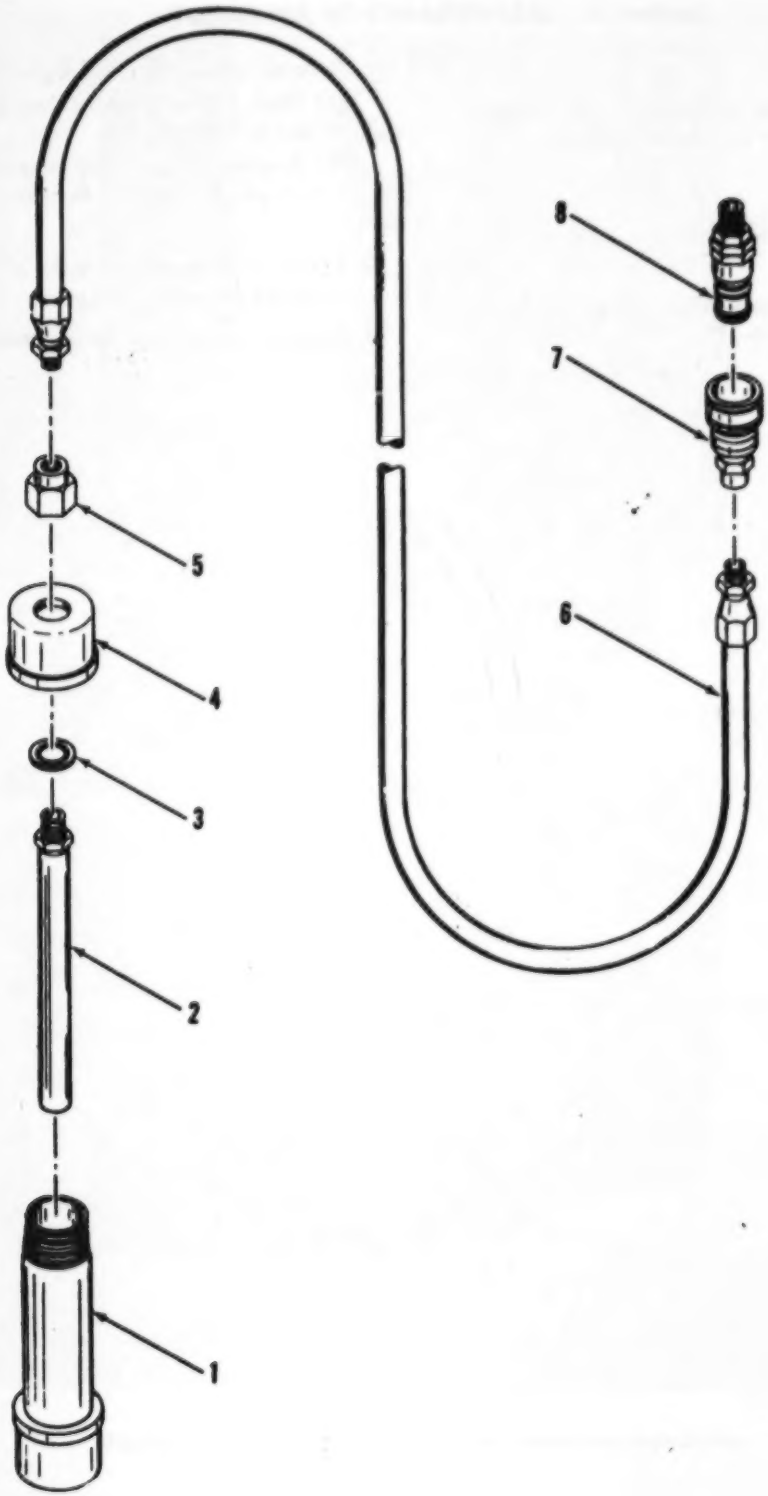
c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for breaks, cracks, and other damage. Replace a damaged or defective part.

d. Reassembly. Reassemble the air gauge in the reverse of the numerical sequence.

e. Installation. Install the air gauge. (fig. 2–3)



ME-3895-332-12/4-13

1. Housing
2. Gauge
3. Washer
4. Cap
5. Coupling
6. Control hose
7. Quick-connect socket
8. Quick-connect plug

Figure 4-13. Air gauge, exploded view.

CHAPTER 5
ADMINISTRATIVE STORAGE

Section I. PREPARATION FOR STORAGE

5–1. General

Prepare for administrative storage in accordance with TM 740–90–1.

Section II. DEMOLITION OF ARMY MATERIAL TO PREVENT ENEMY USE

5–2. General

Refer to TM 750–244–3 for demolition instructions.

APPENDIX A
REFERENCES

A–1. Fire Protection

TB 5–4200–200–10	Hand Portable Fire Extinguishers for Army Users

A–2. Lubrication

C9100IL	Fuels, Lubricants, Oils and Waxes

A–3. Painting

TM 9–213	Painting Instructions for Field Use

A–4. Records

TM 38–750	Army Equipment Record Procedures

A–5. Storage

TM 740–90–1	Administrative Storage

A–6. Demolition

TM 750–244–3	Demolition of Army Material to Prevent Enemy Use

A–7. Maintenance

TM 5–3895–332–25P	Organizational, Direct and General Support and Depot Maintenance Repair Parts and Special Tools List

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B–1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

B–2. Explanation of Columns in Section II

a. Group Number, Column (1). The assembly group is a numerical group assigned to each assembly in a top down breakdown sequence. The applicable assembly groups are listed on the MAC in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. Functional Group, Column (2). This column contains a brief description of the components of each assembly group.

c. Maintenance Functions, Column (3). This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

C—Operator or Crew
O—Organizational Maintenance
F—Direct Support Maintenance
H—General Support Maintenance
D—Depot Maintenance

The maintenance functions are defined as follows:

A—Inspect: To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B—Test: To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C—Service: To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.

D—Adjust: To rectify to the extent necessary to bring into proper operating range.

E—Aline: To adjust specified variable elements of an item to bring to optimum performance.

F—Calibrate: To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G—Install: To set up for use in an operational environment such as an emplacement, site, or vehicle.

H—Replace: To replace unserviceable items with serviceable assemblies, subassemblies, or parts.

I—Repair: To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

J—Overhaul: To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards using the Inspect and Repair Only as Necessary (IROAN) technique.

K—Rebuild: To restore an item to a standard as nearly as possible to original or new

condition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

d. Tools and Equipment, Column (4). This column is provided for referencing by code the special tools and test equipment (sec III) required to perform the maintenance functions (sec II).

e. Remarks, Column (5). This column is provided for referencing by code the remarks (sec IV) pertinent to the maintenance functions.

B–3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T & TE requirements column on the MAC. The letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. Maintenance Level. This column shows the lowest level of Maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal Stock Number of tools and test equipment.

B–4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to Section II. The first letter references column 5 and the second letter references a maintenance function, column 3, A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance Functions A Inspect	B Test	C Service	D Adjust	E Aline	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
01	ENGINE													
0101	Cylinder	O							F	F				
	Retainer System, Anvil								F					
0104	Pistons													
	Damper, Recoil	O							F					
	Ram (Piston)	O							F					
	Ring, Piston and Anvil	O							F					
	Anvil	O							F					
0106	Engine Lubrication System													
	Filter Oil	C	C						C					
	Pump Oil	O	O						O	F				
	Tank Oil	O	O											A–A
0110	Diesel Starting Controls													
	Trip Mechanism, Starting								O	O				
	Rope Assembly	O							O	O				
	Trip Safety Mech.	O							O	O				
0302	Fuel Pump and Filter													
	Pump fuel	C	C						O	F				
	Cam, control	O							O					
0306	Tank, Line and Fittings													
	Tank	O	O	O										B–A
0309	Fuel Filters													
	Fuel filter	C		C					C					
22	ACCESSORIES, ITEMS													
2210	Data Plates & Instruction Holders													
	Plates, data	O							F					
	Plates, instruction	O							O					
43	HYDRAULIC, FLUID, AIR AND VACUUM CONTROLS													
4301	Strainer, Filters Hose Pipe Fittings, Tubing, Etc.													
	Fittings, hose	O							O					
	Hose assemblies	O							O					
4305	Control Valves Piston, Transmitter	O							O	F				
74	CRANE, SHOVELS, AND EARTH MOVING EQUIPMENT COMPONENTS													
7413	Pile Driving Attachments:													
	Cap, pile driving	C							O					
	Gauge, air	C	C	C					O	O				
	Hammer, pile driving	C	C	C					O	O	F	H		

Section III. SPECIAL TOOLS AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool number
1–J 1–K	0	Ram Lifting Rod	D35101

Section IV. REMARKS

Reference code	Remarks
A–A	Tank is part of Cylinder Weldment
B–A	Tank is part of Cylinder Weldment

APPENDIX C

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists items which accompany the hammer, pile driver, or are required for installation, operation, or operator's maintenance.

2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items—Section II. A list of items which accompany the hammer, pile driver and are required by the operator/crew for installation, operation, or maintenance.

b. Maintenance and Operating Supplies—Section III. A listing of maintenance and operating supplies required for initial operation.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items, Section II.

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) Source code indicates the source for the listed item. Source codes are:

Code	Explanation
P	Repair parts which are stocked in or supplies from the GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories.
M	Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked and the mortality of which normally is below that of the applicable end item or component. The failure of such part or assembly should result in retirement of the end item from the supply system.
X1	Repair parts which are not procured or stocked. The requirement for such items will be filled by use of the next higher assembly or component.
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.
G	Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above GS and DS level or returned to depot supply level.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Operator/crew

(3) Recoverability code indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	Explanation
R	Repair parts (assemblies and components) which are considered economically reparable at direct and general support maintenance levels. When the maintenance capability to repair these items does not exist, they are normally disposed of at the GS level. When supply considerations dictate, some of these repair parts may be listed for automatic return to supply for depot level repair as set forth in AR 710–50. When so listed, they will be replaced by supply on an exchange basis.
S	Repair parts and assemblies which are economically reparable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically reparable they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required. The abbreviation "w/e", when used as a part of the nomenclature, indicates the Federal stock number, includes all armament, equipment, accessories, and repair parts issued with the item. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parenthesis. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit. This column indicates the quantity of the item used in the assembly group. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.).

f. Quantity Furnished With Equipment. This column indicates the quantity of an item furnished with the equipment.

g. Illustration. This column is divided as follows:

(1) Figure number, indicates the figure number of the illustration in which the item is shown.

(2) Item number, indicates the callout number used to reference the item in the illustration.

4. Explanation of Columns in the Tabular List of Maintenance and Operating Supplies—Section III

a. Component Application. This column identifies the component application of each maintenance or operating supply item.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the item name and brief description.

d. Quantity Required for Initial Operation. This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

e. Quantity Required for Eight Hours Operation. This column indicates the estimated quantities required for an average 8 hours of operation.

f. Notes. This column indicates informative notes keyed to data appearing in a preceding column.

Section II. BASIC ISSUE ITEMS

(1) SMR Code	(2) Federal stock number	(3) Description Ref No. & mfr code / Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (A) Fig No.	(7) Illustration (B) Item No.
		Group 31—Basic Issue Items, Manufacturer Installed					
		Group 3100—Basic Issue Items, Manufacturer or Depot Installed.					
PC	7520-559-9618	CASE: Maintenance and Operational Manuals, Cotton Duct, water repellent, mildew resistant MIL-B-11743B.		1	1		
		TM 5-3895-332-12		1	1		
PC	7510-889-3494	Binder, Loose Leaf, U.S. Army Equipment Log Book					
PC	D35101	Ram Lifting Rod		1	1		

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 hrs operation	(6) Notes
0108 Tank Lubricating Oil	9150-754-2832 (1)	Oil Lubricating HDO 30	11 Gal (2)		(1) See C9100-IL for Additional Data and Requisitioning Procedures.
	9150-265-7603	OES	11 Gal (2)		(2) See current LO for Grade Application and Replenishment Intervals.
0306 Tank Fuel	9140-286-5294 (1)	Fuel Oil Diesel Required	24 Gal (3)	21.6 Gal (4)	(3) Tank Capacity.
	9140-286-5296 (1)	Grade DF-2 Wintergrade DF-1	24 Gal (3)	21.6 Gal (4)	(4) Average Fuel Consumption 2.7 gpH of Continuous operation.

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